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# Job and billet analysis in the United States Coast Guard

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JOB AND BILLET ANALYSIS IN THE UNITED  
STATES COAST GUARD

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JOB AND BILLET ANALYSIS IN THE UNITED STATES COAST GUARD

A THESIS  
SUBMITTED TO THE  
SCHOOL OF EDUCATION AND  
THE COMMITTEE ON GRADUATE STUDY  
OF  
LELAND STANFORD JUNIOR UNIVERSITY  
IN PARTIAL FULFILLMENT  
OF THE REQUIREMENTS  
FOR THE DEGREE  
OF  
MASTER OF ARTS

By  
JOSEPH PAUL MARTIN  
Commander  
United States Coast Guard  
August, 1949









APPROVED FOR THE GRADUATE STUDY COMMITTEE

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## CHAPTER I

### THE PROBLEM AND ITS SCOPE

#### The Problem

The problem of this thesis is to examine the recommended practices of industry and business, federal and civil organizations, and the Armed Forces in making job analyses; to further determine which practices and methods of job analyses could be utilized for establishing a system of job analysis in the United States Coast Guard. In order to answer the above problem various subordinate problems must be considered as follows:

- (1) What planning is required for the establishment of a job analysis program?
- (2) What methods are used in making job analysis?
- (3) What information was most useful, least useful, and what difficulties were encountered in analyzing jobs?
- (4) How is job analysis kept current?
- (5) What are the requirements for analysts?
- (6) What use has been made of information obtained by job analysis, and what benefits have accrued to the organization?



- (7) Which of the above features could be utilized by the United States Coast Guard, and which should be avoided in establishing a program of job analysis.

This first chapter presents the problem, shows need for the study, delimits the scope of the problem, defines terms required for understanding of job information, reviews various methods of classification and job study, briefly recounts the history of job analysis, explains procedure, and presents a discussion of the United States Coast Guard to aid understanding and to show the magnitude of the problem. Chapters II to IV deal with job analysis in Industry, Civil Organizations, and the Armed Forces, respectively. Chapter V summarizes the data contained in the previous chapters by suggesting a procedure or program of job analysis for the United States Coast Guard.

#### Need for the Study

The United States Coast Guard has no overall organized program for making job analysis. A background study such as this is necessary to formulate a basic plan for establishing a system of job analysis, which is the primary requisite for sound personnel administration and management. This need is recognized by the Coast Guard in the following statement:

The lack of adequate workload measures and the inability to apply them uniformly to comparable





administrative units leaves no basis for effective evaluation of personnel efficiency.<sup>1</sup>

In order to develop adequate workload measures, apply them uniformly to comparable administrative units, to effectively evaluate personnel efficiency, and to properly carry out all other personnel functions, it is first necessary to utilize some method that will give the desired information on which to base such determination. This method is job analysis.

There was a time when the service consisted of a few vessels and life-saving stations. The personnel remained on the same vessels or the same stations for years, progressing through various levels of responsibility and in some cases a surfman eventually attained a position in charge of the station. Under this system it was not uncommon for the "skipper" to know intimately every detail of each and every position on his vessel or station. However, today, with the ever continuing growth of the service, assumption of additional duties and responsibilities, changes due to technological advances, and the ever expanding activities of the service, it would be an unusual commanding officer who knows intimately every detail of the work performed by quartermasters, boatswains, seamen, boilermen, firemen, engine-men, radiomen, radarmen, gunners mates, yeomen, storekeepers,

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<sup>1</sup>U.S. Coast Guard, Weekly Report of Activities and Developments No. 43-48 (Restricted) 22 October, 1948, Washington, D.C., p. 13. (used by permission)





and cooks. The duties are known in general terms but there is no accurate description that defines each and every job. Wallace expresses the need for job analysis as follows:

The increased magnitude and complexity of governmental and business operations has emphasized the need for systematic analysis and classification of positions. In a small enterprise or a small governmental agency the need for a systematic plan is not so marked because the executive can know the employees individually and make his appraisal on the basis of intimate knowledge of the jobs and incumbents. In the large governmental and business units of today it is obviously impossible for the top executives to be familiar with the multitude of positions, activities, organizational relationships, and personnel under their jurisdiction. It is this situation which makes a job analysis and classification necessary in any sound personnel program.

The increase in the number of occupations and the increasing degree of job specialization and sub-division has complicated the problem of establishing a control over jobs and wages. The lack of standardization of job titles has contributed to the confusion and increased the need for systematic job analysis and classification.<sup>1</sup>

Until such information is developed on fact, personnel work can only be based on hunches, guesswork, or sentimental considerations, which have no place in a sound personnel policy. To further illustrate this point--the twelve (12) district personnel officers assign men in accordance with the complements designated by Coast Guard Headquarters. Such assignments may be to cruising cutters, buoy tenders, patrol craft, bases, air stations, depots, lifeboat stations, radio stations, light stations, district offices, or marine inspection

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<sup>1</sup>Wallace, R. F. "Job Analysis, Description and Classification," Personnel Journal, Vol. XXV, No. 1, May, 1946, p. 19.





offices. The personnel officers at Boston and San Francisco also make assignments to loran stations that are scattered throughout the North Atlantic and the Pacific Oceans. The personnel officers have no detailed and accurate information of the work performed by all the different ratings at all the different units. Moreover even the work of two comparable units may be dissimilar due to differences in certain types of equipment, location, terrain, or climate. Thus not only do variations exist in the duties performed, but also in the responsibilities involved, the working conditions and the physical requirements of the various stations. The extent of the personal knowledge possessed by the personnel officers consists of practical experience at a few units, but too often conditions have changed since the officer has had any contact with a unit, or the conditions at one unit are not truly representative of all other units. Consequently, job data is largely made up of hearsay information obtained from personnel who have had various assignments, but such data is inaccurate, misleading, and prejudiced. Thus, the task of assigning the best qualified personnel to a particular job remains an impossibility without accurate and detailed job descriptions.

Proper personnel administration is composed of several functions; namely, recruitment, selection, classification, training, assignment, promotion, transfer, personnel record-keeping, evaluation of performance, discipline, welfare,





recreation, wage and salary administration, separation, and civil readjustment. The functions are interdependent and cannot be considered as separate factors having no relationship to each other. For instance, training is valueless if the man is not properly assigned. Effective training and assignment are dependent on precise job knowledge, by the training officer and detailing officer. Thus, only through job analysis can maximum effective utilization of personnel be achieved.

#### Delimitation of Problem

This study is not intended to be an exhaustive qualitative study of all phases and aspects of job analysis in industry and business, federal and civil organizations, and the Armed Forces. Nor is it meant to be a quantitative statistical analysis of the success or failure of job analysis methods in such organizations. Rather, it is strictly an examination of the practices of a limited and select number of companies, the practices of a few civil organizations, and the practices of the Armed Forces. Furthermore, it is not meant to be a series of case studies of various companies and organizations, but is a selection of the best features of job analysis practices from many different sources.

The problem is further delimited in that no consideration is given to time and motion study. This is omitted mainly for two reasons;





1. Time and motion study is applicable to industry where tasks are of a repetitive and recurrent nature; that is, where the tasks performed by a worker are the same from day to day, or for a considerable period of time. It is applicable in an industry that is usually mechanized and the methods are strictly standardized. In the Coast Guard, the work is of a constantly varying nature that requires personnel to perform many complex tasks in the course of a day. The rescue of sixty-nine survivors in the North Atlantic in October, 1947, from the transatlantic plane, BERMUDA SKY QUEEN, by the Coast Guard Cutter BIBB, does not lend itself to time and motion study. Likewise, the training and preparation for duties in the event of a national emergency or war are not measurable by time-motion study methods.

2. Restrictions are imposed by the federal government that prohibit the use of time and motion study for measuring the output of any federal employee. Although no specific restrictions could be found in Coast Guard appropriation acts for the last ten years, Peterson reports this restriction as follows:

Since 1914-15 there have been riders attached to the Army, Navy and Post Office appropriation Bills specifying that no part of the appropriation "shall be available for the salary or pay of any officer, manager, superintendent, foreman or other person or persons having charge of the work of any employee of the U.S. Government while making or causing to be made with a stop watch or other time-measuring device a time study of any job of any such employee between the starting and completion thereof, or of the movements of any such employee while





engaged upon such work; nor shall any part of the appropriations made in this act be available to pay any premiums or bonus or cash reward to any employee in addition to his regular wages, except for suggestions resulting in improvements as economy in the operation of any government plant; . . . .  
(Public Law 441 - 77th Congress)<sup>1</sup>

Further delimitations are:

1. No consideration is given to job evaluation for the purpose of establishing wage and salary administration, except to indicate that such procedure is utilized in industry and civil organization.
2. No consideration is made of coding procedure or classification of jobs on the basis of job analysis data.
3. No evaluation is attempted of the degree of success or inadequacy of any job analysis plan used by industry, civil organizations, or the Armed Forces.

### Definitions

In order to study job and billet analysis, it is necessary to have a clear understanding of certain basic terms. The terms as used throughout the study are defined here for convenience.

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<sup>1</sup>Peterson, Florence, Chief, U.S. Department of Labor, Bureau of Labor Statistics, Working Conditions and Industrial Relations Branch, Wage Incentive Plans and Collective Bargaining, Industrial Relations Problems Arising Under War Production, Memorandum No. 2. Prepared by the Industrial Relations Division. April, 1942. P. 3.





Task.--A task is a single operation requiring that human effort be exerted for a specific purpose.<sup>1</sup> The work of any one individual usually consists of several tasks. Thus, the work of a storekeeper may consist of several tasks; such as, receipt of stores, issue of stores, keeping records, and taking inventories.

Position.--A position is an aggregation of duties, tasks, and responsibilities requiring the services of one individual.<sup>2</sup> There are always as many positions as there are workers in a plant or office.<sup>3</sup>

Job.--A job is a group of similar positions which are identical with respect to their major or significant tasks.<sup>4</sup> A job always requires the full-time services of one individual, but often requires the services of more than one individual. A job may be considered as a group of positions that are sufficiently alike to justify their being covered by a single analysis.<sup>5</sup> Thus, the duties of a "boatswain's mate"

<sup>1</sup>Training and Reference Manual for Job Analysis, Dept. of Labor, U.S. Employment Service, Occupational Analysis and Industrial Services Division, Washington, D.C., June, 1944, p. 7.

<sup>2</sup>Ibid., p. 7.

<sup>3</sup>Carroll L. Shartle, Occupational Information Its Development and Application, Prentice-Hall, Inc., New York, 1946, p. 11.

<sup>4</sup>Training and Reference Manual for Job Analysis, op. cit., p. 7.

<sup>5</sup>Ibid., p. 7.





aboard two or more vessels of the same class can be considered as being sufficiently alike with respect to their basic tasks, to be called a job. The duties of a "boatswain's mate" at a shore station would constitute a different job.

Occupation.--An occupation is a group of similar jobs found in several establishments.<sup>1</sup> Any recurring job or a group of functionally related jobs which, for classification purposes, are designated by a name or title, is an occupation.

Billet.--A billet is an aggregation of the duties, tasks, and responsibilities requiring the services of one individual.<sup>2</sup> This definition corresponds to the definition of a position in civilian occupations. Thus in the services, the billet that a man occupies consists of all the tasks and duties assigned to him, whether of a routine or emergency nature. The sum of all the billets in the service is equal to the complement of the service.

Rating.--A rating is the name given to an occupation which requires essentially the same kind of aptitude, training, experience, knowledge, and skills.<sup>3</sup>

<sup>1</sup>Carroll L. Shartle, op. cit., p. 11.

<sup>2</sup>Frank E. Swanson, Job and Billet Analysis in the U.S. Navy, Unpublished Master's thesis, Stanford University, Palo Alto, Calif., 1947, p. 13.

<sup>3</sup>Ibid., p. 42.





Rate.--A rate is a pay grade classification within a specific rating, reflecting levels of aptitude, training, experience, knowledge, skill, and responsibility.<sup>1</sup>

Pay grade.--A pay grade is a classification given to service personnel for the purpose of determining their pay. All the men within a given pay grade receive the same basic compensation.<sup>2</sup> There are eight pay grades for enlisted personnel, and six pay grades, called pay periods, for officers.

Rating structure.--The rating structure of the Coast Guard consists of the ranks, ratings, rates, grades, and pay grades which roughly identify the abilities, experience, knowledge, and skills of the various personnel required to operate the service.

Complement.--A ship's complement is its total manpower budget expressed in terms of the number of men in each rating and rate that are considered necessary for most efficient operation of the ship.<sup>3</sup> The total complement of the service is the sum of all the billets required for optimum efficiency.

Allowance.--An allowance is the number of men of each rating or rate actually available to the service due to budgetary limitations. This number may equal the complement, or may be less than the complement. The terms complement and allowance are frequently used interchangeably.

Job Analysis.--Job analysis is a method of determining

<sup>1</sup>Ibid., p. 42.

<sup>2</sup>Ibid., p. 43.

<sup>3</sup>Ibid., p. 62.





and reporting pertinent information relating to the nature of a specific job.<sup>1</sup>

Billet analysis.--Billet analysis is the method of determining and reporting pertinent information relating to the nature of a specific billet (position) as employed by the U.S. Navy. It includes the studying and detailed reporting of all routine duties, and in addition the duties that may be performed at infrequent intervals, such as at battle stations, emergencies, special sea details, sea watches, and in port watches. Billet analysis often is of greater scope than job analysis for all the positions in an organization are studied to show varying duties and responsibilities under different specified conditions.

Position-Classification.--Reduced to its simplest terms, classification of positions means the process of finding out, by obtaining the facts and analyzing them, what different kinds or "classes" of positions, calling for different treatment in personnel processes, there are in the service; it further includes making a systematic record of the classes found and of the particular positions found to be of each class. The duties and responsibilities of the positions are the basis upon which classes are determined and the individual

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<sup>1</sup>Training and Reference Manual for Job Analysis,  
op. cit., p. 7.





positions assigned or "allocated" to their appropriate classes.<sup>1</sup>

We see from these definitions that job analysis in business management and position-classification in public administration are basically the same techniques, differing in details but fundamentally the same.<sup>2</sup>

Job Description.--A job description is a written record of duties, responsibilities, and requirements of a particular job.<sup>3</sup> A job description is a product of job analysis.

Job Specification.--A job specification is a written record of the requirements sought in the individual worker for a given job.<sup>4</sup> The terms "job description" and "job specification" are used rather loosely, but job description is usually the more inclusive term and includes the information from which job specifications are prepared.

Job Classification.--Job classification is the segregation of jobs into classifications or groups. This may be

<sup>1</sup>Isamar Baruch, Chairman. Civil Service Assembly of the United States and Canada. Position Classification in the Public Service, Civil Service Assembly of the United States and Canada, Chicago, 1941, p. 3.

<sup>2</sup>R. F. Wallace, "Job Analysis, Description and Classification," Personnel Journal, Vol. XXV, No. 1. May, 1946, pp. 18-30.

<sup>3</sup>Walter D. Scott, et al., Personnel Management, 3rd ed. McGraw-Hill Book Co., Inc., New York, 1941, p. 238.

<sup>4</sup>Ibid., p. 238.





done on the basis of a job analysis or on the basis of other factors depending on the purpose or need for the classification.

Job Evaluation.--Job evaluation is a systematic method of appraising the worth or value of each job in relation to other jobs in the company organization.<sup>1</sup> Job evaluation is based on a study of jobs, without consideration of the ability or personality of the individual in the job, and establishes a fair relationship among the various jobs within an organization.<sup>2</sup>

#### Classification of Occupations or Jobs

To aid in personnel administration many methods of study and classification have been utilized for the purpose of distinguishing one occupation from another, and one job from another. Some of these methods of classification are:

1. Job evaluation and job classification based on a complete job analysis in which jobs are arranged into grades or levels depending on the duties performed, the complexity of the tasks, the responsibility exercised, and the qualifications required.<sup>3</sup>

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<sup>1</sup>Paul Pigors and Charles A. Myers, Personnel Administration, McGraw-Hill Book Company, Inc., New York, 1947. P. 222.

<sup>2</sup>Metropolitan Life Insurance Co., An Introduction to Job Evaluation, New York, 1947, p. 5.

<sup>3</sup>Dictionary of Occupational Titles, Parts I and II, U.S. Government Printing Office, 1939.





2. U.S. Census Classification which classifies occupations on the basis of ten types of work and cross-classifies according to industries.<sup>1</sup>

3. Amount of ability required. The jobs are arranged into levels according to the degree of complexity of the abilities required. This method of classification has not been developed to any great extent.

4. Amount of intelligence required for the position based on intelligence test scores. The U.S. War Department divided occupations into superior, high average, average, low, and inferior intelligence levels.<sup>2</sup>

5. Amount of education required by the person in a particular job, or required for entrance into the job. Such classification can be elementary, secondary school, high school, college, graduate.

6. Degree of skill required or possessed by a majority of the workers, divided into professional, technical, skilled, semi-skilled, unskilled.<sup>3</sup>

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<sup>1</sup>U.S. Census. Occupations-General Report, Vol. 5, pp. 46-47-410-560, U.S. Government Printing Office, Washington, 1930.

<sup>2</sup>U.S. Adjutant General's Department, Personnel System of the U.S. Army, Vol. 1, pp. 165-234, U.S. Government Printing Office, Washington, 1919.

<sup>3</sup>C. A. Koepke, "A Job Analysis Survey," Occupations - The Vocational Guidance Magazine, Vol. 12, pp. 28-31, June, 1934.





7. Amount of income in various occupations, based on earnings, as developed by H. F. Clark.<sup>1</sup>

8. Amount of interest in an occupation, based on comparison of the interests of any individual with the interests of persons in certain occupations. Strong has developed thirty-nine occupational interest scales for men and twenty-five occupational interest scales for women.<sup>2</sup>

9. The social status or socio-economic status as developed by Edwards which classifies occupations into six main groups; namely, professional, proprietary and managerial, clerical, skilled, semi-skilled and unskilled.<sup>3</sup>

10. A "functional pattern" technique of classifying jobs developed by Davis, who investigated the relationship between job titles and the functions performed by men in the advertising profession.<sup>4</sup>

Many other methods have been developed to assist in distinguishing jobs from each other such as prestige value, potential challenge, length of time required to learn the

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<sup>1</sup>H. F. Clark, Life Earnings in Selected Occupations in the United States, Chapter 26, Harper & Bros., New York, 1937.

<sup>2</sup>E. K. Strong, Jr., Occupational Interests of Men and Women, Stanford University Press, Stanford, 1943.

<sup>3</sup>A. M. Edwards. A Social-Economic Grouping of the Gainful Workers of the U.S. U.S. Government Printing Office, Washington, D.C., 1936.

<sup>4</sup>E. W. Davis. A Functional Pattern Technique for Classification of Jobs. New York Teachers College, Columbia University, 1942.





beginning skills of a job, working with things or working with people, amount of contact with people, personal characteristics of the workers, and functions performed by the worker.

All of the above methods of study and classification have been developed primarily for the purpose of better understanding the distinguishing characteristics of jobs. Of all the separate methods of study, the greatest amount of overall information can be gained by job analysis for it combines the data obtained by a number of different classifications.

In the service, many different classifications of personnel are in daily use, although they often are not generally recognized as separate classification systems. First, the personnel are divided into officer personnel, enlisted personnel, and civilian personnel. Secondly, each group is divided into ranks, ratings, or grades respectively, and further divided into pay periods and pay grades for pay purposes. The ratings are further divided into rates. Other classifications that are often even less apparent than the ones listed above are: (1) Fitness reports for officers, which classify officers according to a rating scale, (2) proficiency marks for enlisted personnel which distinguish such personnel according to their proficiency or usefulness to the service. Other classifications made are on the basis of intelligence, which require that a certain minimum mark





be attained on the General Classification Test and other tests before a man is eligible for assignment to a certain school or duty. Still another classification is based on minimum knowledge and length of service for entrance into or advancement to a certain rating. All of the classifications have their own specific purposes, and are necessary for proper personnel administration. Job analysis is just another method of job study which would permit a more complete understanding of the work performed by personnel in the service.

#### History of Job Analysis

If any one individual could be called the father of job analysis, this distinction would probably fall to Frederick W. Taylor<sup>1</sup> for his studies in the science of work, functional management, more careful selection and placement of operatives, and analyzing jobs into component parts to discover more efficient methods of operation. Taylor's work was carried on at the beginning of the century. Some work had been attempted before this time in the Civil Service, beginning with the Civil Service Commission of 1871, but such work was of a very elementary nature. The actual pioneer work in job analysis or position-classification, as we know it today, was not developed until 1911. This work

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<sup>1</sup>Frederick W. Taylor, The Principles of Scientific Management, Harper and Bros., 1911.





was the result of the study by Griffenhagen<sup>1</sup> for the Civil Service Commission of Chicago, and was based on Taylor's work. Further studies by Griffenhagen were conducted for the municipal service, mostly at the Commonwealth Edison Co., Chicago, and were extended to other companies and governmental agencies. During World War I the Personnel Division of the U.S. Army analyzed jobs to facilitate classification of men with certain job experiences. According to Lytle,<sup>2</sup> World War I caused a rapid growth in the new personnel movement and "job analysis" became one of its important activities. In 1914 the city of Richmond, Virginia, used job analysis as a basis for a community survey in order to organize and teach vocational courses according to the detailed classification.<sup>3</sup>

About the same time a number of industrial and business concerns pioneered work in job analysis. A few such concerns were:

National Carbon Company

Westinghouse Electric and Manufacturing Company

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<sup>1</sup>E. O. Griffenhagen, "The Origin of the Modern Occupational Classification in Personnel Administration," Public Personnel Studies, Vol. 2, No. 6, September, 1924, pp. 184-194.

<sup>2</sup>Charles W. Lytle, Job Evaluation Methods, New York, The Ronald Press Co., 1946, p. 103.

<sup>3</sup>Edwin W. Davis, A Functional Pattern Technique for Classification of Jobs. New York Teacher's College, Columbia University, 1942, p. 7.





American Rolling Mill Company

International Harvester Company

Curtis Publishing Company

At the same time, position-classification plans were adopted by many states and cities throughout the country.

Prior to 1918 the job descriptions were always a narrative form and not strictly representative of the minimum requirements of the job. Shortly after 1920 practically every manufacturing company of any size was using job analysis as a basis for personnel work. In 1923 the Federal Classification Act for classification of all Civil Service employees was passed. The most complete classification based on job analysis ever made was done by the U.S. Employment Service starting in 1934.<sup>1</sup> The introduction of the Dictionary of Occupational Titles in 1940 was responsible for an increased interest in occupational information as obtained by job analysis. Further work was carried on by the USES to analyze jobs in the U.S. Army and in defense plants for the purpose of showing relationships between jobs to aid in transfer of workers from peacetime industry to war production. As reported by Shartle:

By the summer of 1942 employers and government agencies were using occupational analysis materials in problems of manpower utilization, with emphasis on upgrading, job breakdown, manning tables, in-plant

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<sup>1</sup>Carroll L. Shartle, et al., Ten years of Occupational Research, "Occupations - The Vocational Guidance Magazine," Vol. XXII, No. 7, April, 1944, p. 389.





use of tests, studies of labor turnover and absenteeism, use of women, and the designation of essential and critical occupations. In 1943 relationships were worked out between Navy jobs and civilian occupations for the United States Employment Service to use in interviewing discharged Navy personnel. By 1944 similar materials were developed in cooperation with the Army for use in the Veterans Employment Service.<sup>1</sup>

The outbreak of World War II, necessitated the rapid expansion of the Armed Forces, mobilization of large numbers of men, and development of complex equipment. The Army, Navy, and Marine Corps realized the lack of job information for effective placement and utilization of the large numbers of men and women inducted into the services. To alleviate this deficiency in job information, job analysis programs were instituted by all three services, and are being carried on at the present time.

#### Investigation, Collection, and Interpretation of Data

The method used in the present study was to first survey the field of literature covering job analysis, job evaluation, and job classification. It soon became evident that some method of supplementing the information contained in the literature was necessary if specific data concerning job analysis programs were to be obtained from industry, civil organizations, and the Armed Forces. Accordingly, two questions had to be answered: (1) What industries or organizations

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<sup>1</sup>Carroll L. Shartle, et al., op. cit., p. 390.





were to be studied? (2) What method was to be used for obtaining information from the organizations?

The survey of a large number of industrial and business concerns would be useful for a quantitative study of job analysis. However, for the purposes of this study it was desired to investigate how the recommended procedures were actually working out in practice. For this purpose a small number of companies or organizations with well developed programs were required. Further, such companies had to be within a reasonable distance of the San Francisco Bay area to permit personal contact and interview of personnel engaged in such work. In the cases where personal contact was not feasible, correspondence was employed. This method was necessary for obtaining information from the various Armed Forces, U.S. Employment Services, Federal Civil Service, and California Personnel Board.

The next question dealt with the kind of information desired to augment that obtained from the literature. Accordingly, a questionnaire containing thirty items was prepared, primarily as a guide for myself in obtaining specific information during interviews. This questionnaire was prepared in outline form and was sent to the various branches of the Armed Forces, U.S. Employment Service, Federal Civil Service, and the California Personnel Board. To indicate the type of information sought, the questionnaire is reproduced here.





## JOB ANALYSIS QUESTIONNAIRE

The information desired in this questionnaire is to obtain information required for the preparation of a Master's thesis at Stanford University. The purpose is to study job analysis in Industry and Business, Public Organizations, and the Armed Forces, to determine which practices could be utilized by the United States Coast Guard. Your cooperation in answering all or any part of the questions will be greatly appreciated.

For purposes of uniformity, Job Analysis is defined as a method of determining and reporting pertinent information relating to the nature of a specific job.

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1. Name of company or organization.
2. Name of person interviewed or answering questions and relation to the company.
3. Business company is engaged in.
4. Number of employees.
5. When was job analysis instituted in your company or organization?
6. What method was used in making the job analysis?
7. Were different methods of job analysis required for various levels of employees?
8. Was job analysis made of supervisory and top management positions? What method was used?





9. What use has been made of the information obtained by job analysis?
10. After making job analysis, have any changes been made in the number of employees, or in the tasks comprising a job?
11. Has job analysis showed need for training? If so in what respect?
12. Has job analysis been of any use in showing lines of promotion?
13. How has job analysis aided in organizational problems?
14. How has job analysis facilitated fiscal control of personnel services in allotting funds, and in preparing budget estimates?
15. How has job analysis been used for recruitment and placement?
16. Of the information obtained, what was the most useful?
17. Of the information obtained, what was the least useful?
18. What difficulties were encountered in making job analysis?
19. What shortcomings were found in the job analysis?



20. What improvements could be made in job analysis as applied to your organization?
21. What length of time was required to complete job analysis in your organization?
22. What method is used to keep job analysis current?
23. How often are general surveys of entire units made?
24. What are the requirements for job analysts in your organization?
25. How many analysts were required to make the job analysis in your organization?
26. How many analysts are required to keep job analysis current?
27. What specialized training was given to the job analysts?
28. Where was such specialized training given?
29. What average length of training is required before a student analyst makes a satisfactory job analysis?
30. Request any additional comments you consider pertinent to this subject.





This technique has the advantage that theoretical and ideal procedures are actually checked against practical methods employed by companies having considerable experience with job analysis. On the other hand there are a number of minor limitations, such as:

- (1) The inaccuracy arising out of making generalizations on the basis of a small number of companies. Use of a larger number of organizations may have given different results.
- (2) In preparing the questionnaire considerations of getting sufficient information had to be weighed against keeping the form short enough so a busy executive would be willing to answer it.

The data obtained by questionnaire was compared with data contained in literature, and the practices most generally recommended and utilized are reported. Such practices are then related to the requirements of the United States Coast Guard. The data presented for the Coast Guard are based on personal experience in that service during the past seventeen years, and on various publications of the Coast Guard as cited.

#### The United States Coast Guard

In order to understand the application of job analysis to the Coast Guard some knowledge of the history, place in the government structure, duties, organizations, facilities, and types of personnel making up the service is essential.





Without such knowledge of the nature of the service, the specific problems involved in the application of job analysis methods to the Coast Guard cannot be appreciated.

### History

The United States Coast Guard serves as the federal maritime law enforcement agency and protector of life and property at sea. The history of the Coast Guard dates back to 1790 when an act of Congress, designed to enforce the Custom Laws, provided for the building of "ten boats" for the United States Revenue Marine, which later became known as the United States Revenue Cutter Service. In 1871 Congress authorized the Lifesaving Service as a separate administrative organization within the Revenue Cutter Service. By act of June 18, 1878, the Lifesaving Service became an independent unit of the Treasury Department and was operated as a separate organization until an Act of Congress, dated January 28, 1915, merged the Revenue Cutter Service and Lifesaving Service into a unified service known as the United States Coast Guard. In 1916 Coast Guard aviation was authorized by Congress. In 1939 the Bureau of Lighthouses was transferred from the Department of Commerce into the Coast Guard. In 1942 the Bureau of Marine Inspection and Navigation, originally established in 1838 as the Steamboat Inspection Service under the Department of Commerce, was temporarily transferred to the Coast Guard. During World War I and World War II, as well as during





preceeding wars, the Coast Guard was operated under the Department of the Navy; at all other times it was operated and is now being operated under the Treasury Department. In 1946 the temporary transfer of the Bureau of Marine Inspection and Navigation to the Coast Guard was made permanent, and the personnel of that service were integrated into and given status in the Coast Guard.

### Place in the Government Structure

The Coast Guard is constituted as a military organization and is part of the Armed Forces of the United States, but it holds a unique position in that it operates as a specialized service within the Department of the Navy in time of war and as a branch of the Department of the Treasury in time of peace. As reported by Ebasco Services Incorporated:

The place of the Coast Guard in the governmental structure seems dictated by the consideration that it meets the need for an organization:

Capable of performing a multitude of functions related to guarding the coasts and enforcing Federal maritime laws, the violation of which have both civil and military aspects;

Which, in addition, can discharge assistance and aids to navigation responsibilities in direct support of our maritime commerce;

Yet constituted for ready incorporation in a larger national defense arm in time of war while retaining a form compatible with civil agency operation in peace.<sup>1</sup>

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<sup>1</sup>Ebasco Services Incorporated, Study of the United States Coast Guard, New York, January, 1948, p. 9. (Unpublished) (Used by permission)





The Coast Guard meets this triple requirement by being a military service, operating as part of the Navy in time of war, and operating under the Department of the Treasury in time of peace.

### Duties

The duties of the Coast Guard may roughly be divided into three classifications of functions; namely, (a) Assistance and Law Enforcement, (b) Aids to Navigation, and (c) Military Preparedness. Ebasco Services Incorporated reports Coast Guard activities as follows:

a. Assistance and Law Enforcement.

Definition: The rendering of aid and the protection and saving of life and property upon the high seas and the navigable waters of the United States, its Territories and possessions; and the administration and enforcement of laws and regulations relating directly to navigational shipping and maritime safety, and the collateral enforcement of laws and regulations administered by other Federal departments and agencies upon the high seas and the navigable waters of the United States, its Territories and possessions.

In the performance of its Assistance and Law Enforcement function, the Coast Guard:

Maintains lifesaving stations, vessels on patrol, rescue vessels, and aircraft at strategic points along the coasts and inland waterways.

Provides emergency medical aid to persons in distress at sea.

Sends small boats and trained personnel to inland areas to assist in flood and hurricane relief operations.

Enforces laws relating to navigation and merchant shipping.





Acts as an auxiliary enforcement agency with respect to laws relating to customs and revenue, immigration, quarantine, the protection of fish and game and other matters which fall within the jurisdiction of other Federal agencies, but which require marine personnel and facilities for effective enforcement.

Administers laws and regulations relating to inspection of merchant vessels and their safety equipment, licensing and certification of officers and crews of such vessels and periodically inspects both vessels and equipment including fire fighting and lifesaving equipment.

Reviews plans for construction or alteration of merchant vessels and is concerned with safety standards relating to construction, equipment and operation of yachts, motor-boats and other non-commercial vessels.

Investigates marine casualties and accidents.

Leads and supports the Coast Guard Auxiliary, a voluntary organization of yacht and motor-boat owners, supplying instruction in principle and practice of safe navigation, and developing the Auxiliary as an organization capable of supplemental assistance in aiding vessels in distress, as well as extending instruction in safety practices.

Breaks ice for navigation on inland lakes, rivers and canals and in harbors on the Atlantic Coast.

Maintains a patrol of ships in the North Atlantic [and Pacific Oceans] equipped with special weather observation apparatus to collect and supply weather information essential to air and surface vessel transport.

#### b. Aids to Navigation.

Definition: The establishment, maintenance, operation and administration of light and signal stations, lighthouses, light vessels, buoys, bells fog signals, sirens, whistles, horns, float lights, submarine signals, beacons, day-marks, lighted





seamarks, radio beacons, and other electronic equipment and devices used, or designed for use in aid of navigation, on land, on bridges or other structures, and on or under water, serving as a means of facilitating and promoting safe navigation of vessels and aircraft on and over the high seas and the navigable waters of the United States, its Territories and possessions.

In the performance of its Aids to Navigation function, the Coast Guard:

Maintains a complex system of aids to navigation which includes lighthouses, lightships, fog signals and radio stations.

Locates and destroys derelicts and other obstacles to navigation; administers and participates in the International Ice Patrol in the North Atlantic.

Assists the Weather Bureau in collection and dissemination of flood, storm and hurricane warnings.

Operates Loran, which is a long-range aid to navigation employed by aircraft on trans-oceanic flights between the United States and Europe and between the United States, the Philippines, Japan and intervening areas. (This system is now being adopted by surface vessels).

#### c. Military Readiness.

Definition: Maintaining a state of Readiness so as to function as a specialized service of the Navy in time of war in order that it may be quickly integrated into the Navy in condition of high operating efficiency, with facilities modern and well-maintained, adequately manned and with personnel so trained as to be of immediate effectiveness.

In performing its Military Readiness function, the Coast Guard:

Operates as part of the Navy in time of war or when the President shall so direct; performs port security duties to insure safety of naval vessels.





Participates in plans and actions of the Military Establishment in the interest of national defense.

Incorporates military features in Coast Guard floating units and shore establishments, including ordnance, armament, and fire control equipment.

Trains and indoctrinates personnel during peacetime for wartime duties.

Maintains a reserve force of officers and enlisted personnel for active duty in the event of national emergency.<sup>1</sup>

### Organization

The Coast Guard is administered by the Commandant of the Coast Guard and his staff with Headquarters in Washington, D.C., from where emanates the broad policy and direction for the guidance of the service. The field organization is composed of twelve District Coast Guard Offices in the continental United States, Hawaii, Alaska, Puerto Rico, and the Virgin Islands. The district offices are responsible for the specific direction and guidance of the operating units and supporting logistic units. The operating units such as ships, aircraft, air stations, light stations, lifeboat stations, radio stations, Marine Inspection Offices, and bases; and logistic supporting units such as training stations, repair yards, and depots, are under the immediate control of their commanding officers. The usual chain of command runs from the Commandant to the District Commander to commanding

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<sup>1</sup>Ibid., pp. 26-28.





officer. The specific duties of the service are performed by individual units.

### Facilities

To carry out its multitudinous and complex duties, the Coast Guard must operate and maintain a fleet of vessels and numerous shore establishments of a varying nature. In addition, the amount and types of equipment necessary to meet the requirements of the service appear staggering when listed statistically. No detailed account of all activities will be attempted but a limited amount of statistical information is necessary for an adequate understanding of the Coast Guard. The Standard Distribution List<sup>1</sup> identifies the following numbers of units:

|  |            |
|--|------------|
| Vessels  | 277        |
| Shore Establishments (Headquarters and Headquarters Units) | 27         |
| Shore Establishments (Standard District Units)             | 630        |
| Miscellaneous (Certain Headquarters and District Units)    | 105        |
| Subunits of larger units                                   | <u>445</u> |
| Total  | 1,684      |

The vessels listed are from the largest with a length of 327 feet and specially constructed ice-breakers to eighty-three-foot patrol vessels. In addition, on 30 June, 1948, the service was operating 1,506 motorboats ranging in size

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<sup>1</sup>United States Coast Guard, Standard Distribution List, USCG, Washington, D.C., 1 April, 1949, p. 5.





from ten to thirty-six feet. The aviation branch of the Coast Guard consists of nine air stations with sixty-nine fixed wing aircraft and fourteen rotary wing aircraft assigned. The 40,000 miles of coast line are dotted with 166 lifeboat stations, 363 manned light stations, and sixty light attendant stations. The requirements of the nation's Merchant Marine are met with forty-six Marine Inspection Offices. Scattered on the islands of the Pacific, Alaska, Philippines, Japan; and in the Atlantic in Greenland, Labrador, and Newfoundland are thirty-two loran transmitting stations. A few of the additional activities include twelve bases, forty-one depots, sixteen radio stations, and twenty electronic repair shops. In connection with its aids to navigation duties it is required to maintain and operate 36,000 aids to navigation, consisting of buoys, unmanned lighthouses, markers, beacons, bells, and fog horns. Training facilities include the Coast Guard Academy at New London, Connecticut, and a Recruit Receiving Center at Cape May, New Jersey. In addition, the Coast Guard operates land telephone lines and submarine cables along the coast line which connect remote lifeboat and light stations.

### Personnel

In order to meet the heterogenous organizational, administrative, operative, and logistic requirements of the Coast Guard all types of personnel are required for maximum





efficiency, from the highest professional specialist down to the unskilled laborers. In addition to the many civilian skills, trades, and professions required, many skills are needed that correspond to military and naval skills, and still others that are primarily peculiar to the Coast Guard. These varying requirements are met by personnel that can be roughly classified into four main categories--commissioned officers, warrant officers, enlisted men, and civilians. Cadets who are undergoing training are not being considered for they will attain commissioned officer status upon completion of education.

The approximate number of personnel composing the Coast Guard are as follows:

| Classification        | Number       |
|-----------------------|--------------|
| Commissioned officers | 2,050        |
| Cadets                | 450          |
| Warrant officers      | 800          |
| Enlisted men          | 20,600       |
| Civilians             | <u>1,200</u> |
| Total                 | 25,100       |

However, mere numbers do not indicate the true nature of the personnel composing the Coast Guard. To understand this it is necessary to keep in mind the history of development and growth characterized by the merging of diversified services and intermittent periods of naval service. The integration of the Bureau of Lighthouses in 1939, and the Bureau of Marine Inspection and Navigation in 1946, necessitated the assimilation of large numbers of civilian





personnel into a military establishment. This was accomplished by inducting all personnel of those services into the military service, if they desired military status and could meet the age and physical requirements for military duty. The induction was on a socio-economic basis in which civilians were given a military position as commissioned officers, warrant officers, or enlisted personnel, corresponding as nearly as possible to the status they enjoyed in their own service. Personnel who did not desire or were unable to meet the requirements for military service, were retained in a civilian status under Federal Civil Service Regulations.

Thus, the commissioned officer personnel are composed of graduates of the Coast Guard Academy, former Lifesaving Service personnel, former Lighthouse Service personnel, former Bureau of Marine Inspection and Navigation personnel, former Warrant officers, former enlisted men, and Reserve officers who were offered permanent commissions. The warrant officers are likewise composed of personnel whose main experience may have been in other bureaus and enlisted personnel who have advanced in some speciality. The enlisted personnel are men whose experience varies from thirty years service to newly inducted recruits barely eighteen years of age. The civilian group is made up of remnants of other bureaus who do not desire military status, and clerical employees, mostly female, who enjoy Civil Service status.





From the foregoing discussion two things should be readily apparent--first, that the functions of the Coast Guard require many different jobs with varying duties, working conditions, performance requirements, skills, knowledge, and responsibilities; and secondly, the personnel are a heterogeneous group possessing greatly different degrees of skill, ability, education, knowledge, and experience. The constant problem is how to procure, train, and assign men for and to jobs for which they are best fitted; that is, to secure the most effective utilization of manpower to attain maximum operational efficiency. This problem has not been solved in the Coast Guard, nor in any other walk of life. Strong expresses this as follows:

The increasing use of job analysis is extending our understanding of the elements of many jobs. But much remains to be done before guidance is as efficient as may be. One of the obstacles to real progress is the fact that two rather different sets of components are used in analyzing jobs and men. Consequently after both men and job have been sized up it is still quite a problem to determine whether or not they fit.<sup>1</sup>

This same idea was expressed by Wallace in this manner:

One of the basic steps in any sound personnel program and one which is related to virtually all other aspects of personnel administration is a systematic study, appraisal, and classification of the jobs to be performed. This study lays the basis for determining the appropriate sources of workers, serves as a basis for selection, training, rating, compensation, and transfer, promotion, and

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<sup>1</sup>E. K. Strong, Jr., Vocational Interests of Men and Women, Stanford University Press, Stanford, 1943, p. 413.





other personnel functions. Before these functions can be performed effectively it is necessary to know what jobs are to be done, what types of workers and personal abilities are required, and how these are related to each other.<sup>1</sup>

The problem of placing the personnel of the service into the jobs for which they are best fitted would be greatly facilitated by a clear definition and understanding of what the specific requirements of each job are.

### Summary

Many different methods have been devised to study jobs and men for the purpose of assisting in the science of personnel management and administration. The technique of job analysis is one of the methods that has been used by industry and public organizations in various forms during the past forty years. It is the purpose of this thesis to examine the practices of job analysis and to show what application can be made of job analysis by the Coast Guard, which is a complex military organization with civil duties and whose personnel must perform a multitude of heterogeneous functions.

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<sup>1</sup>R. F. Wallace, "JOB ANALYSIS, Description and Classification," Personnel Journal, Vol. XXV, No. 1, May, 1946.





## CHAPTER II

### JOB ANALYSIS IN INDUSTRY

#### Introduction

In planning a job analysis program many separate steps must be considered if the program is to be of any value to the company. The program should be planned to meet the specific needs of the establishment that desires to prepare such analyses. Consistent with the objectives and the degree of thoroughness desired in the analyses, there are many programs, ranging in complexity from a superficial survey of obvious job facts to a detailed study by time and motion methods, and all surrounding conditions.

This chapter will discuss the practices of job analysis in industry. The steps necessary for planning the program will be outlined. Methods of analyzing jobs will be presented. Difficulties and shortcomings of job analysis will be discussed. Methods and problems involved in keeping data current will be considered. This will be followed by a discussion of the qualifications and training of job analysts, and the possible uses or benefits that an organization may derive from a job analysis program.

#### Planning the Program

To be effective the decision to install and adopt a job analysis program must be made by the top management of





the company. The implications of adopting the program must be fully understood and appreciated at the top level for all phases of the organization will be affected, and once a company is committed to a program it will serve as the basis of future personnel administration. The decision to analyze and describe jobs clarifies the basic factor of personnel administration--the job performed by the worker; consequently, it is a decision in favor of sound management, by discovering and tabulating facts about the jobs being performed. However, the decision to adopt the program is only the first step, to be effective it must be actively supported in all subsequent steps and active support of all levels of management is necessary. Otis and Leukart<sup>1</sup> in discussing job evaluation state that the final test of managements' acceptance and support is in the willingness to accept the facts as determined. This applies equally to job analysis since job analysis is a preliminary step to job evaluation.

Having made the first decision to install a job analysis program, the second decision to be made is who should do the job. There are three methods commonly used for this purpose; namely, (1) hiring an industrial relations firm or a group of management engineers to come into the company for the purpose of analyzing the jobs, (2) utilizing employees of the company to install the program, and (3) employing a consulting

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<sup>1</sup>Jay L. Otis and Richard H. Leukart, Job Evaluation, Prentice-Hall Inc., New York, 1948, p. 152.





service for advice and supplementing it with employees of the company. The third method is really a combination of the previous two. All three methods have certain advantages and disadvantages, but the third method is generally found to be the most satisfactory in practice. The Labor Relations Advisors in its advisory letter state the following concerning the third method:

We believe that unless a company has an extensive experience in job evaluation work and a tests technique, it would be wise to utilize the services of an industrial engineering organization. Such organizations have an accumulated experience and technique which is invaluable. We hasten to add, however, that we are not among those who believe a company can call in an engineering firm and simply turn the job over to it. A company which does that makes almost as serious a mistake in our judgment, as the company which, lacking experience and a technique, tries to do the job itself.<sup>1</sup>

The same Labor Relation Advisory Letter gives the following:

1. A company should first define its OBJECTIVES in undertaking job evaluation.
2. An industrial engineering organization should be given the job of planning the job evaluation, supplying the experience and technique, directing the work, and doing much of the work.
3. The company should supplement the engineers' experience and technique with the company's own detailed and peculiar knowledge of its operations and jobs.<sup>2</sup>

Another decision in connection with the planning of the second step is the determination of what particular department within the organization will be responsible for the

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<sup>1</sup>Labor Relations Advisory Letter, June 15, 1945, Labor Relations Advisors, 10 East 43rd Street, New York.

<sup>2</sup>Ibid.





job analysis. Practice differs among companies, with job analysis being the responsibility of any of the following departments: Personnel, Industrial Relations, Industrial Engineers, and Organization or Planning. Usually a separate job analysis division is formed under one of the above departments.

The third decision required for the installation of a job analysis program is to decide what jobs in the company are to be analyzed. The practices in industry differ, some companies only analyze jobs of hourly workers, others also analyze jobs of office clerical workers and foremen; while some few companies analyze all employees, including supervisory, administrative, professional, and executive personnel. For instance, the Standard Oil Company of California analyzes all jobs in the company.<sup>1</sup> In the Bank of America, out of approximately fifteen thousand employees, only the top twenty-seven positions are not analyzed.<sup>2</sup> The General Foods Corporation uses two methods of job analysis, one for all employees with salaries below \$5000, and a different system for the top 600 positions in the company.<sup>3</sup>

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<sup>1</sup>Statement by Ralph C. Elliot, Supervisory Analyst, Standard Oil Company of California, 23 March, 1949.

<sup>2</sup>Lecture of D. W. Taylor, Stanford University, 8 April, 1949.

<sup>3</sup>Bertram B. Warren, "Evaluation of Managerial Positions," Advances in Methods of Personnel Evaluation, Personnel Series No. 107, American Management Association, New York, 1947, pp. 3-21.





The fourth and last step required in planning the job analysis program is the selection and adoption of tools and procedures that are to be used in actually doing the job. Four main tools are necessary for establishing an effective program of job analysis. They are: (1) Preparation of instructions or manual covering the entire program. (2) Preparation of instructions for establishing an analysis procedure which clearly defines all the information to be collected. (3) Preparation, test, and adoption of job information forms. This may include preliminary job analysis forms, questionnaires, job description forms, job specification forms, and physical demands forms. (4) Establishment of control procedures and a time schedule that will be followed in collecting job information data.

#### Analyzing Jobs

Job analysis in industry can generally be divided into two classifications: (1) Job analysis for personnel administration and management, and (2) time and motion study and methods analysis for engineering purposes. These two methods, respectively, can further be roughly classified as (1) analysis of the job as a whole, and (2) analysis of the various specific tasks making up the job. This study is concerned with the first method only. Job analysis as a technique should be clearly distinguished from the uses and applications of job analysis. It should always be borne in mind





that job analysis is not an end result but only a means of studying jobs and recording information, which will be useful for other purposes. Thus, before undertaking the job analysis the objectives must be clearly defined, the purposes for which job analysis data are to be utilized must be determined and the procedure adjusted to give the desired information. Job descriptions and job specifications are the end result which determine what kind of information will be obtained. In preparing for job analysis it is necessary to determine: (1) The job analysis techniques, (2) what information will be obtained and in how much detail, and (3) how the information will be organized and recorded.

In undertaking job analysis, careful differentiation of job analysis and worker analysis is imperative. In worker analysis the incumbents in a particular job are studied to discover the characteristics they possess. In job analysis the incumbents are observed but information is sought about the job and not the person occupying the position.

Sources of Information.--The sources of information on which job analysis data can be based are many. All of these methods are employed to a certain extent by various companies to fit their particular needs. The end result, job descriptions and job specifications, is the object in each case even though the method employed varies. The information necessary for the preparation of a job description may be obtained in





one or more of the following ways:

1. By observation of the job performed.--This source of information is probably the most commonly used. It consists of a trained analyst observing and recording the activities of a worker while engaged in his job. In cases where the job is complex, or in administrative positions where most of the work is performed in a man's head, this method will not yield accurate information.

2. Interview with person doing the job.--This is the second most common source of information, and is frequently used in conjunction with observation of the work being performed. This method is dependent on the degree of cooperation with the worker that the analyst is able to attain, and the ability of the worker to describe his work accurately. Even in cases where the worker is cooperative and can describe his work accurately, the possibility exists that certain tasks may be inadvertently omitted.

3. Interview with the supervisor of the job.--Although this method is frequently used, it is not a good primary source of information. Too frequently the supervisor does not have an intimate knowledge of all jobs under his direction. However, this method can well be used to check information obtained by the first two methods listed above.

4. Completion of questionnaires or forms by the worker.--This method, although sometimes employed, is not as satisfactory as the methods listed above. The majority of the workers





will either misinterpret the questionnaire or are not able to adequately describe their jobs in writing. Moreover, the workers often are unable to distinguish between the important and minor aspects of their jobs, consequently, undue emphasis may be placed on minor details and important functions may be minimized or omitted entirely. Benge, Burk, and Hay state:

Questionnaires can, however, be valuable in studying the jobs of certain types of employees, particularly those usually found in salaried positions. Such questionnaires give the employee a feeling of participation in the study, enable the analyst to determine what specific information is required in addition to the information given on the questionnaires, and give the analyst some idea as to the job contents prior to the interview with the employee.<sup>1</sup>

5. Completion of questionnaire or forms by the supervisor on the job.--The discussion in subparagraphs (3) and (4) above apply to this method of job analysis. However, many companies use this method as the primary source of information. In addition, a supervisor may attempt to magnify the job in order to increase his own importance.

6. Study of the materials of work.--An excellent secondary source of information can be obtained by a study of the tools, equipment, machines, and forms, and relating such data to the information obtained by other sources.

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<sup>1</sup>Eugene J. Benge, Samuel L. H. Burke, and Edward N. Hay, Manual of Job Evaluation, Harper and Brothers, New York, 1941, p. 64.





7. Study of company manuals, charts, bulletins, etc.--The duties and qualifications of many jobs in a company are usually defined in some manner even though no organized system of job analysis exists. Such data can be invaluable in furnishing a starting point for job analysis.

8. Actual performance on the job.--In some complex jobs adequate information cannot be obtained about the job except by actual performance. In such cases the incumbent must write up his job, or in extreme cases it may be necessary to train an analyst to do the job, before it can be described adequately.

Of all the methods enumerated above the method most commonly employed and the most practical method is a combination of observation of the job and interview of the incumbent.

Job Analysis Technique.--In analyzing jobs there is no one standardized procedure that is superior to all others. The procedure developed by the United States Employment Service, which is based on fifteen years of personnel research, and the analysis of some 30,000 jobs, is the most comprehensive, and is the one that will be considered in this study.

A satisfactory job analysis requires that the information obtained must accurately distinguish one job from another, and must clearly indicate the scope of the tasks encompassed by each job.





Basically, there are but three parts to the analyses of any job: (1) The job must be completely and accurately identified; (2) The tasks of the job must be completely and accurately described; (3) The requirements the job makes upon the worker for successful performance must be indicated--the second of these three parts is outstandingly important--the complete and accurate describing of the job tasks. Without this the rest of the analysis lacks meaning.<sup>1</sup>

In its Guide for Analyzing Jobs, the United States Employment Service gives the job analysis formula as:

WHAT the worker does

HOW he does it

WHY he does it

SKILL INVOLVED

Responsibility

Job knowledge

Mental Application

Dexterity and Accuracy<sup>2</sup>

Besides the information derived by the formula above, additional information is required for personnel work. While this information is not essential to an understanding of the job itself, it is essential for certain specific uses for proper personnel administration. This area of information

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<sup>1</sup>United States Employment Service, Division of Occupational Analysis, Training and Reference Manual for Job Analysis, U.S. Government Printing Office, Washington, D.C., 1944, p. 1

<sup>2</sup>United States Employment Service, Division of Occupational Analysis, Guide for Analyzing Jobs, Department of Labor, U.S. Government Printing Office, Washington, D.C., 1946.





concerns the physical demands of the job and is outlined as follows:

#### PHYSICAL DEMANDS

Physical activities  
Working conditions  
Hazards

Forms.--The forms used for obtaining job analysis data vary with different companies. Forms are either of a narrative type or check-off type or combination of both. Lytle discusses the principles of form design as follows:

As in the design of most forms the first principle (1) is to keep between excess complexity and excess brevity, that is, to provide for definite portrayal of all essential facts but no more. The second principle (2) is to arrange the essentials in the order which will facilitate the entry of data, the use of the information and explanations of the results.

In endeavoring to keep within both principles there arises a choice between the use of prose and the use of a prearranged check list. The latter certainly facilitates entries, and to a certain extent aids definiteness, thereby minimizing errors of interpretation, but some job duties cannot be adequately covered by a universal check list. Thus some combination of prose and check list is most satisfactory. The nature of the work involved and the thoroughness of treatment desired must determine the proportionate use of these two means of record. In all cases there must be harmony of order between related forms. This is important for entry, use, and explanation.<sup>1</sup>

The form used by the United States Employment Service, called a Job Analysis Schedule, consists of five parts. The five parts are further subdivided into twenty-two items. Since most forms generally contain all or part of the items

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<sup>1</sup>Charles W. Lytle, Job Evaluation Methods, The Ronald Press Co., New York, 1946, pp. 111-116.



used by the United States Employment Service, the items are reproduced as an example of the kind of items contained in a typical form.

### JOB ANALYSIS SCHEDULE

#### Part I IDENTIFICATION DATA

1. Job Title
2. Number
3. Number Employed
4. Establishment Number
5. Date - number of sheets
6. Alternate Titles
7. Dictionary Title and Code
8. Industry
9. Branch
10. Department

#### Part II WORK PERFORMED

11. Work performed

#### Part III SOURCES OF WORKERS

12. Experience
13. Training data
  - Minimum Training Time
    - (a) Inexperienced workers
    - (b) Experienced workers
  - Training - Specific Job Skills acquired through training
    - In plant
    - Vocational
    - Technical
    - General Education
    - Activities and hobbies
14. Apprenticeship
  - Formal
  - Informal
  - Length required
15. Relation to other jobs
  - (a) Promotions from and to, transfers, etc.
  - (b) Supervision received
    - General
    - Close
    - By (Title)





- (3) Supervision given  
 None  
 Number supervised  
 Titles

#### Part IV PERFORMANCE REQUIREMENTS

16. Responsibility (consider material or product, safety of others, equipment or process, cooperation with others, instruction of others, public contracts, and the like.)
17. Job knowledge (consider pre-employment and on the job knowledge of equipment, materials, working procedures, techniques, and processes).
18. Mental application (consider initiative, adaptability, independent judgment, and mental alertness).
19. Dexterity and accuracy (consider speed and degree of precision, dexterity, accuracy, coordination, expertness, care, and deftness of manipulation, operation, or processing of materials, tools, instruments, or gages used).

#### Part V COMMENTS

20. Equipment, materials and supplies
21. Definition of terms
22. General comments<sup>1</sup>

To secure physical demands information an additional form is provided covering such information. This form consists of a check list for physical activities and working conditions. The details of hazards are described in narrative form. On the reverse side of this form a check list is provided for checking worker characteristics.

The study of any job in accordance with such form eliminates indefiniteness and guesswork and provides specific

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<sup>1</sup>Training and Reference Manual for Job Analysis,  
op. cit., pp. 10-52.





information on which objective personnel action is possible.

Shartle summarizes the job analysis form into seven basic elements as follows:

1. Identification Data: name the job and locate it specifically.
2. Work Performed: describe the tasks involved.
3. Performance Requirements: indicate the demands that the job places on the worker for successful performance.
4. Sources of Workers: include also necessary training and experience.
5. Comments: present the technical and general background of the job.
6. Physical Demands: point out working conditions and physical factors.
7. Worker Characteristics: the analyst's estimate of the inherent characteristics of the worker that are brought into play by the job.<sup>1</sup>

Dictionary of Occupational Titles.--No discussion of job analysis would be complete without mention of the Dictionary of Occupational Titles published by the United States Employment Services.<sup>2</sup> The Dictionary of Occupational Titles, commonly called DOT, contains job titles, job definitions, and classifications. Part I contains job definitions for 17,452 separate jobs known by 29,744 job titles. A new edition which identifies approximately 22,000 jobs and lists

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<sup>1</sup>Carroll L. Shartle, et al., "Ten Years of Occupational Research," Occupations - The Vocational Guidance Magazine, Vol. XXII, No. 7, April, 1944, p. 392.

<sup>2</sup>U.S. Employment Services, Dictionary of Occupational Titles, Parts I and II, U.S. Government Printing Office, Washington, D.C., 1939.





approximately 40,000 job titles was published in March, 1949.<sup>1</sup>

### Difficulties and Shortcomings of Job Analysis

Before undertaking an expensive and laborious technique such as job analysis, it is necessary to examine the difficulties and shortcomings of the technique to determine whether installation of the program is justified. If it is justified, then some of the causes of failure of other programs should be looked into.

It must be remembered that there is no one best technique or procedure that may be employed for all conditions. The technique requires adjustment to suit the objectives of the program. Moreover, a program that is found successful in one company or under one set of conditions may be entirely unsuitable for some other company or under different conditions. Job analysis is not an end in itself but only a means to an end--actually it is only one of the means of attaining an end result. If this point is lost sight of, Howard says there is:

A serious risk of being blinded by the sheer beauty of "Job Analysis" in the abstract, and the great returns which such an ideal system could bring to the organization.<sup>2</sup>

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<sup>1</sup>United States Employment Security, Publications United States Employment Service, U. S. Government Printing Office, Washington, D.C., January, 1949.

<sup>2</sup>Robert L. Howard, "Job Analysis, To Buy or Not to Buy?" Personnel Journal, Vol. 25, No. 1, May 1946, p. 32.





The most commonly reported difficulties and shortcomings are:

1. Lack of full cooperation and participation on the part of personnel at all levels in the organization.
2. Training of job analysts.
3. Getting the facts about the position or job.
4. Writing the facts in language that is precise.
5. Agreement as to the importance of certain duties or functions making up the job.
6. Lack of standard terms for describing jobs.
7. Lack of uniformity of expression in the job descriptions.
8. Failure to properly plan the program and getting all of the facts about the job.
9. Failure to keep job analysis current.
10. Delay in reporting changes in job content.
11. Use of procedures that are unnecessarily technical, when a much simpler technique would suffice.
12. Failure to apply common sense in keeping job analysis at a practical level.
13. Failure to accept the facts as determined.
14. Failure to make a pilot study before undertaking job analysis for the entire organization.
15. Impatience for results.<sup>1</sup>

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<sup>1</sup>Items 1 to 10 inclusive were developed during conversations with Mr. Ralph C. Elliott, Supervising Analyst, Standard Oil Company of California; and Mr. A. B. Teehenor, Personnel Director, Watson Navigation Company. Items 11 to 15 inclusive adapted from Metropolitan Life Insurance Company, An Introduction to Job Evaluation, New York, 1947, p. 27.





In making job analyses and writing job descriptions it should be realized that any analysis is based on both fact and opinion. The facts can be ascertained by observation, interview, and records, while opinions are obtained from the judgments of individuals making the study. Benge, Burk, and Hay state:

Those assigned the responsibility for the preparation of job descriptions should realize that both facts and opinions enter into the preparation of a job description form. The matters of fact are the duties assigned to the individuals, their responsibility limits in connection with each duty, the conditions under which they work, their working hours, average overtime, and so on. Matters of opinion deal largely with the qualifications which the individual needs in order to learn to do the work satisfactorily.

Because qualifications are largely matters of judgment, it is well to secure many informed opinions. Certainly the employees on any job should have some means by which they can express their ideas as to the qualifications required. The immediate supervisors should also have an opportunity to state their opinions. If all persons involved have an opportunity to express their opinions, it becomes possible to enter the resulting consensus on the job description form at the time it is prepared.<sup>1</sup>

In the writing of job descriptions, Smith and Murphy found that clarity of presentation is improved if the following principles are adhered to:

1. Each sentence should begin with a functional verb.
2. The present tense should be used throughout.
3. A terse direct style should be employed, omitting all unnecessary words.<sup>2</sup>

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<sup>1</sup>Op. cit., p. 63.

<sup>2</sup>Richard C. E. Smith and Matthew J. Murphy, Job Evaluation and Employee Rating, McGraw-Hill Book Co., New York, 1946, p. 77.





In a study of job evaluation plans, Baker and True<sup>1</sup> discuss reasons for failure of job evaluation plans. The reasons for failure that apply to job analysis can be summarized into the following:

- (1) Weaknesses of installation.--The manner in which a plan was inaugurated determines its success of operation. Initial mistakes often delay the acceptance of a plan indefinitely.
- (2) Inadequate administrative organization.--Failure to coordinate and supervise the essential activities of the plan, and a feeling that the plan is self-perpetuating results in many failures. Careful definition and assignment of responsibility for administration is most important to the satisfactory maintenance of any plan.
- (3) Change in executive personnel.--The change of key personnel often results in a lack of interest and support of the plan by top management with consequent loss of interest by the rest of the organization.
- (4) Administrative inflexibility.--The outstanding reason for failure is inflexibility to inevitable change. Disregard of the changes brought about in production methods, organization, and other factors without

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<sup>1</sup>Helen Baker and John M. True, The Operation of Job Evaluation Plans, Industrial Relations Section, Princeton University, Princeton, New Jersey, 1947, p. 15.





adjusting the plan to such changes leads to certain failure.

An excellent evaluation of job analysis is made by Howard,<sup>1</sup> in which he discusses or mentions many of the shortcomings. Additional difficulties that Howard considers that were not enumerated above are:

- (1) Excessive emphasis may be placed on "analysis" by examining minutely the parts of a job and failure to consider its "wholeness". Actually the whole can never be described by a description of the parts.
- (2) Too frequently there is a tendency to describe a job as a thing separate from the organization. No job can actually have much meaning if taken out of its context, thus, its relationship to other jobs and the organization as a whole must be made clear.
- (3) Analysts will usually differ in their interpretation, and description of the same job. Howard<sup>2</sup> says, "Five different men trained in job analysis working independently on the same five jobs usually will come up with five different answers". Consequently, it is imperative that combined judgments be utilized for obtaining a satisfactory job analysis.

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<sup>1</sup>Robert L. Howard, op. cit., pp. 32-35.

<sup>2</sup>Ibid., p. 33.





Keeping Data Current

The question as to length of time that is required to complete and install a program of job analysis in a company often presents itself. Since the answer depends on many factors, such as number of employees, complexity of the jobs, geographical location of the jobs, analysis technique employed, and the number of analysts available, no generalization can be made to fit all conditions. Moreover, it must be remembered that even if all the jobs in the company are analyzed and described, the job is not completed. For by the time a complete analysis can be made, many of the jobs will have been eliminated, new ones will have been added, and the responsibilities and duties of many others will have been changed.

The only basis available on which to base the length of time required for an original analysis is the experiences of other companies. Reports of length of time required for installation of job analysis programs vary from a period of three months to two years. One company employing approximately 25,000 persons estimates the length of time required for a complete job analysis of all positions to be ten man years, exclusive of clerical assistance. The same company further estimates that six to eight man years are required to keep job analysis current.

Periodic review of all jobs is required to reflect actual conditions in an organization. A review will be required when:





- (1) Any new features have been added to the job.
- (2) Any features of the job have been eliminated.
- (3) The method of doing the job, the tools or materials have been changed.
- (4) There is executive or supervisory dissatisfaction with the job.
- (5) There is worker or union dissatisfaction with the job.

Wallace, in discussing analysis and classification as a continuous process, says,

It is important to bear in mind that job analysis and classification is a continuous process and that the installation of a job-classification system does not complete the job. The necessity for continuous or periodic revision of the classification system is due to the changing nature of the positions. In the words of one authority, "The position-content of government services and the duties-content of individual positions are not static and immutable. Both change with time, sometimes rapidly, sometimes slowly. In a large jurisdiction, formal changes affecting positions are continually occurring. Existing activities may be terminated, diminished, or modified. Reorganizations, revisions of methods and processes, alterations in flow of work, or redistribution of authority may take place as a result of improved administrative management. Thus, additional and new positions are created, and existing ones are abolished, merged, subdivided, or materially altered. Changes of this sort are normal in a government as well as in any other organization.

As these changes occur, the job descriptions, class descriptions, organization charts, salary schedules, and other phases of the program must be revised to reflect the actual conditions which exist in the organization. To fail to keep the plan current defeats the objectives of the whole program.<sup>1</sup>

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<sup>1</sup>R. F. Wallace, "Job Analysis, Description, and Classification," Personnel Journal, Vol. XXV, No. 1, May 1946, p. 28.





It is the responsibility of supervisory personnel to advise job analysts whenever changes occur in any job. However, in actual practice this is not always done because of pressure of work or for other reasons. Some supervisors hesitate to report changes of a depreciatory nature and only report changes of an appreciatory nature. Nevertheless, the point that requires emphasis is that supervisory personnel must actively participate in the program and must report all changes if the job analysis program is to be effective.

#### Job Analysts

The ultimate success of any job analysis program is dependent upon the personal contribution of the individual job analysts. It is the analyst who uses or misuses a technique, and whose judgment and interpretation goes into the job description.<sup>1</sup> This suggests that more accurate information can be obtained by employing a group of independent observers, and pooling their independent judgments and interpretations into a composite job description. Moreover, the judgments and interpretations of the analysts can be developed and improved by systematic training.

The qualifications necessary for analysts as reported by companies in the San Francisco Bay area are: A college degree, several years of business or industrial experience,

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<sup>1</sup>Edward Salner, "Job Analysts," Personnel Journal, Vol. VII, No. 1, May, 1938, p. 31.





and from several months to two years on the job training in job analysis.

The qualifications required by analysts as reported by Salner are:

- (1) Technical or industrial familiarity.
- (2) Intellectual agility.
- (3) Ability to record observations in writing.
- (4) Ability to get along with others.<sup>1</sup>

The qualifications as defined by Denge, Burk, and Hay<sup>2</sup> are divided into analytical ability and personality. "Analytical ability" involves the facility for obtaining facts from a large number of employees at all levels, ability to distinguish essential from non-essential facts, and the ability to record the facts. "Personality" refers to the ability to convince others of the analyst's sincerity, ability to maintain friendly relationships, and tenacity to stick by what he believes to be right.

Salner<sup>3</sup> says that in training the job analyst, the emphasis should be on the problem and its environment. This training should consist of three integrated parts. First an introduction explaining the purpose and meaning of job analysis. Second a delimitation of the current problem and

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<sup>1</sup>Ibid., p. 32.

<sup>2</sup>op. cit., pp. 58-60.

<sup>3</sup>op. cit., pp. 33-34.



its origin and nature, showing job analysis as the avenue of approach to its solution. Third the tying in the generalization from the first two steps, and teaching the specific techniques of job analysis. The error frequently made is in placing undue emphasis on the third part; that is, on the specific techniques in making the job analysis, without adequate emphasis on the aims and purposes of the project itself. While procedures and techniques are important, the success of the program depends upon the extent to which the job analyst comprehends the purpose.

To assist in the selection of individuals who are suitable for the detailed work involved, the United States Employment Service has developed a battery of tests for selection of job analysts.

#### Uses of Job Analysis

Various authorities report numerous uses of job analysis, and claim imposing benefits that industry may derive from the use of job information. Lerga reports twenty uses for job information as follows:

1. Job grading and classification.
2. Wage setting and standardization.
3. Provision of hiring specifications.
4. Classification of job duties and responsibilities.
5. Transfers and promotions.
6. Adjustment of grievances.
7. Establishment of a common understanding between various levels of workers and management.
8. Defining and outlining promotional steps.
9. Investigating accidents.
10. Indicating faulty work procedures or duplication of effort.





11. Maintaining, operating, and adjusting machinery.
12. Time and motion studies.
13. Defining limits of authority.
14. Indicating cases of individual merit.
15. Indicating causes of personal failure.
16. Education and training.
17. Facilitating job placement.
18. Studies of health and fatigue.
19. Scientific guidance.
20. Determining jobs suitable for occupational therapy.<sup>1</sup>

The United States Employment Service reports the following as products of job analysis:

Job definitions of the Dictionary of Occupational Titles  
 Classifications of Occupations for Parts II and IV of the Dictionary  
 Job Descriptions  
 Interviewing Aids  
 Job families  
 Trade Tests  
 Aptitude Tests<sup>2</sup>

This list is expanded to include wartime uses of job analysis developed by the Occupational Analysis Division as follows:

Determining the suitability of jobs for the employment of women.  
 Determining the suitability of jobs for the physically handicapped.  
 Determining the relative importance of jobs in the war effort.  
 Revising hiring requirements.  
 Realigning job tasks for job breakdown.  
 Realigning job tasks to shorten training periods.  
 Outlining the training courses for specific occupations.<sup>3</sup>

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<sup>1</sup>Joseph E. Zerga, "Job Analysis; A Resume and Bibliography," Journal of Applied Psychology, Vol. XXVII, No. 3, June, 1943, p. 251.

<sup>2</sup>Carroll L. Shartle et al., "Ten Years of Occupational Research," Occupations - The Vocational Guidance Magazine, Vol. XXII, No. 7, April, 1944, p. 391.

<sup>3</sup>Ibid.





Notwithstanding the many uses and benefits claimed for job analysis information, many companies are either not using such information, or making only a limited use. The primary use in industry is for purposes of job evaluation in wage and salary determination. Secondary uses are for the purpose of improvement and standardization of the methods of production; organizational planning; and the functions of hiring, promotion, and transfer. Other minor incidental uses are mentioned but they are subordinate to the above purposes.

Probably one of the best discussions of the uses of job analysis was made by Bergen<sup>1</sup> twenty years ago. The uses advocated by Bergen are equally applicable today; in fact, with the ever increasing emphasis on human relations in industry, they appear more important today than twenty years ago. Although industry has not yet made full use of job analysis as given by Bergen, there is no indication that such use is not practical or feasible. While in many respects this is an ideal list, summarizing the main points is justified to indicate further uses of job analysis. Bergen divides the uses into three groups as uses of job analysis, position specification, and position classification. Actually all three terms are really "job analysis" as defined in this study.

## I. Uses of Job Analysis

### A. Improvement of Organization by:

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<sup>1</sup>Garret L. Bergen, "Uses of Job Study," Personnel, Vol. VI, No. 3, November, 1929, p. 85-100.



1. Developing relations among functional, departmental, divisional, and sectional units. Shows inter-relationship of units, basis for constructing organization charts, indicates where organization is not functioning efficiently, reduces friction among operating authorities, and outlines path of operation from development of policy to its execution.
2. Defining limits of authority.--Ill-defined limits of authority are disclosed and overlapping authority is eliminated.
3. Disclosing overlapping and duplication of effort is a wasteful utilization of manpower, job analysis brings such cases to light and indicates where savings of manpower and dollars may be effected.
4. Disclosing improper space layout.--In making job analysis it is necessary to study the flow of work respecting the product, clerical duties, and lines of communications. Illogical arrangement of departments may be disclosed and can be eliminated.

### B. Improvement of Operation by:

1. Disclosing faulty procedures of work.--  
Variation in procedure of work among employees





doing the same work will be brought to light and can be standardized.

2. Disclosing faulty conditions of work.--

Improvement of unsatisfactory working conditions is necessary for maximum worker effectiveness.

3. Disclosing faulty machinery.--Faulty or

obsolete machinery is discovered. Improper care and idle time of machinery is also shown.

C. Education of Personnel by:

1. Defining contents and limits of position.--

Participation of all employees in job analysis results in wholesale education of personnel with respect to their jobs. The functions, duties, and responsibilities are clearly defined and brought to the attention of the worker.

2. Promoting common understanding of work between employee and supervisor.--The points

of view of the employee and the supervisor are coordinated and reconciled, and misunderstandings are resolved or eliminated.

3. Promoting a common understanding of personnel problems between the supervisory forces

and the personnel department.





#### D. Disclosure of Individual Merit

Job analysis often discloses individuals with unusual talents or abilities.

#### E. Disclosure of Causes of Failures

Study of working conditions, qualifications needed, etc., may furnish concrete evidence, when considered with respect to present and past incumbents of the job, if incompatible relations between the position and the incumbents. If there are repeated failures, undesirable conditions may be eliminated to mitigate the incompatibility between job and worker.

### II. Uses of Position Specifications

#### A. Improvement of Selection and Placement by:

1. Facilitating employment for specific positions.
2. Outlining information to be obtained in the employment interview.
3. Enable interviewer to tell applicant of conditions under which he is hired.
4. Offering basis for development of vocational tests.

#### B. Improvement of Training and Study by:

1. Indicating need of training in certain positions.--Discloses positions which are most likely to benefit from scheduled



training. Learning is facilitated by stressing important material and eliminating irrelevant material.

2. Outlining training of employee by supervisor.--By clearly defining the job, facilitates 'on the job' training.
3. Outlining study by employee of positions with which he has contact.--Employees can gain perspective by study of job descriptions of operations preceding and following their own work.
4. Outlining study by employee of positions ahead.--This permits employees to have a clear understanding of promotional possibilities and to provide specific direction to training required for advancement.
5. Offering basis for development of manuals of procedure, standard practice instructions, etc.--Development of such material is required for proper training of new employees.

C. Improvement of Transfer and Promotion by:

1. Facilitating selection of employees for transfer or promotion on the basis of their capacity to fill specific positions.
2. Offering basis of detection of "round peg in square hole."





D. Improvement of Methods of Reporting and Recording Personnel Activities by:

1. Offering permanent record of positions.
2. Offering basis of improvement of other filing.
3. Offering basis of improved forms.
4. Offering standard terminology for use in conversation, memoranda and correspondence.

E. Improvement of Measure of Production by:

1. Indicating units of output.

F. Improvement of Personnel Grading by:

1. Offering basis of rating scales.

III. Uses of Position Classification

A. Improvement of Promotional Procedure by:

1. Indicating "blind alley" positions for elimination or special treatment.
2. Indicating the development of recognized lines of promotion.
3. Indicating the development of alternative lines of promotion for employees of unusual ability.
4. Offering basis of development of a promotion chart.
5. Offering the basis of development of a plan and procedures to be used in making promotional adjustments.





### B. Improvement of Compensation Practice by:

1. Offering basis of development of scientific salary schedules.
2. Offering basis of development of a plan and procedures to be used in making salary adjustments.

The extent of the uses enumerated by Bergen by any company depends on the objective and needs of the particular organization. Job analysis in itself does not guarantee any of the benefits but only furnishes information on which to base personnel action. The best and most complete analysis is useless if the facts are not put to practical application.

### Summary

Fundamentally, the principle underlying a job analysis program is that action must be based on facts. Installation of the program must be preceded by careful planning based on: (1) decision of top management to go ahead with the program, (2) decision regarding who should do the job, and (3) decision respecting what jobs are to be analyzed, and (4) selection of the job analysis technique. In analyzing jobs there is no one best system in existence; the method to be used varies, depending upon the objectives and the needs of the organization, and must be adapted to fit the specific requirements of the establishment. Precise planning and methodical study of job facts may not entirely



eliminate the difficulties and shortcomings of job analysis but will aid in minimizing them. Since jobs are subject to inevitable change, a continuing program of revision is necessary if descriptions are to be representative of current conditions. The success of the job analysis is dependent on the contribution of individual analysts; consequently, careful selection and training of analysts is required. The uses of job analysis are many but the program must be designed to fit specific requirements, and no benefits can be expected from job analysis alone. If any benefits are to accrue to an organization, it will be the result of practical application to personnel action of the factual information obtained.





## CHAPTER III

### JOB ANALYSIS IN THE PUBLIC SERVICE

#### Introduction

In the public service the term "Job Analysis" is used infrequently, while the term "position-classification" has general acceptance. However, both terms can be considered synonymous.<sup>1</sup> Classification itself may be interpreted as having three distinct meanings: (1) dividing the entire administrative service into the positions that are under the civil service and those that are not subject to it, (2) division of the civil service into the class that is affected by competitive examination and that which is not so affected, (3) listing of the authorized positions as belonging to a certain competitive group, including their titles, duties, and salaries.<sup>2</sup> The primary concern of this chapter is with the third meaning of classification, that of studying the positions and recording the pertinent facts about them. In this chapter it is proposed to show the development of position-classification, consider the techniques of position-classification, examine the difficulties and shortcomings of

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<sup>1</sup>Supra, p. 13.

<sup>2</sup>Oliver P. Field, Civil Service Law, University of Minnesota Press, Minneapolis, 1939, p. 49.





position-classification, survey the problems involved and methods used in keeping data current, determine the staff required and the cost of the program, and lastly to consider the uses that can be made of position-classification.

### Development of Position-Classification

With thousands of individual positions in a public organization, it is futile to attempt any objective personnel action without precise and complete information about the positions, and without some method of differentiation on a realistic basis. Lacking a system of classification, the executive cannot know which positions are sufficiently similar to be treated in like manner, and which require different treatment. To determine the treatment to be accorded a position, the action requires support by facts and logic based on broad considerations that apply to the entire organization. The basis of classification is constituted on the criteria that positions that are alike in one or more respects be placed in the same class and that positions that are different in those respects be placed in a different class.<sup>1</sup> Positions may be classified on more than one basis because of their varying characteristics. Thus, in classifying positions it is necessary to select the basis which effectively serves the predetermined purposes of the classification and

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<sup>1</sup>Ismar Baruch, "Basic Aspects of Position-Classification," Public Personnel Review, Vol. I, No. 3, October, 1940, p. 2.





the uses to which it is to be put. Baruch states that effective personnel administration requires that there be applied to positions the same processes of objective classification and definition that are customarily used to bring order out of a complex array of facts in science, art, and administration generally.<sup>1</sup> Thus, position-classification establishes a logical and consistent relationship among: (1) the duties and responsibilities of positions, (2) the standards of qualifications to fill them, and (3) where similar employment conditions prevail, the salaries paid. It is the purpose of position-classification to establish and maintain this relationship and to serve as a primary tool for personnel administration.<sup>2</sup>

Recognizing the need for an effective tool to serve as the basis of personnel action, in 1912 the city of Chicago adapted a system of position-classification, and shortly this program was followed by other states, counties, and cities. Today practically all states, counties and most sizable cities have established such systems of classification. The federal service also recognized this need by passing the 'Classification Act of 1923'.<sup>3</sup> The authority to classify stems from

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<sup>1</sup>Ibid., p. 2.

<sup>2</sup>Civil Service Assembly of the United States and Canada, Position-Classification in the Public Service, Chicago, 1941, p. 33.

<sup>3</sup>Public Law No. 516 - 67th Congress.





some particular legislative action or ordinance; consequently, public administrators have a definite duty and responsibility to classify positions. The right to classify does not carry with it the right to create or eliminate positions. The effect of position descriptions or class specifications, as they are variously called, is to describe duties and responsibilities, not to restrict or prescribe them.<sup>1</sup>

In the Federal Civil Service, the classification is shaped according to five basic groups, which are further subdivided into grades of difficulty and responsibility. The easiest and most routine positions have the lowest grade number, the numbers increase with increasing difficulty and responsibility so that the most exacting and difficult positions have the highest grade number. The basic groups and grades authorized by the Classification Act of 1923 are as follows:

P - The professional and Scientific Service, divided into grades from P 1 to P 7 inclusive.

SP - The Subprofessional Service, divided into grades from SP 1 to SP 8 inclusive.

CAF - The Clerical, Administrative, and Fiscal Service, divided into grades from CAF 1 to CAF 14 inclusive.

Cu - The Custodian Service, divided into grades Cu 1 to Cu 10 inclusive.

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<sup>1</sup>Civil Service Assembly of United States and Canada, op. cit., p. 388.





CN - The Clerical-Mechanical Service, divided into grades  
CN 1 to CN 5 inclusive.

Not all federal employees are subject to the provisions of the Classification Act of 1923. A number of agencies of the federal government, including Home Owners' Loan Corporation, Tennessee Valley Authority, Farm Credit Administration, Farm Security Administration, and others have authority to fix rates for positions without regard to the Classification Act of 1923. These agencies, recognizing the necessity for a position-classification plan, have developed plans adapted to their own specific needs.<sup>1</sup>

Other groups of federal employees and public service employees can be considered in special categories, and as such, are usually not subject to Civil Service jurisdiction. The employees in these categories are elective officers, legislative groups, heads of departments, deputies, confidential positions, and labor class.<sup>2</sup>

Although some positions in the public service are exempt from classification, most positions are studied and identified with respect to their duties and responsibilities. However, to clearly evaluate the duties and responsibilities of any position, it is necessary not only to study the position

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<sup>1</sup>Civil Service Assembly, op. cit., pp. 19-20.

<sup>2</sup>Oliver P. Fields, op. cit., pp. 67-75.





itself but also the organization of which it is a part, and the relationship of the position to the organization.

### Position Classification Techniques

In considering position-classification techniques it must be remembered that the technique to be employed must fit the objectives of the overall program. In industry the technique for obtaining job facts is determined by the purpose of the program and what use will be made of the information. Many job analysis programs in industry require more detailed job information than is necessary in the public service, where the main objectives are to: (1) define the duties and responsibilities, (2) determine qualifications required, and (3) establish salaries. Moreover, since the classification merely defines the positions without power to establish or to restrict, the techniques required are much simpler than those utilized by industry. The Civil Service Assembly of the United States and Canada defines the ultimate allocation factors required for classification as follows:

The duties and responsibilities of a position can be factually set forth, studied, and analyzed according to certain basic elements, which are here spoken of as ultimate classification factors, namely, (1) subject matter, function, profession, or occupation represented; (2) difficulty and complexity of duties; (3) nonsupervisory responsibilities; (4) supervisory and administrative responsibilities; and, to the extent that they may not be involved in the other factors, (5) qualification standards. Accordingly, it is convenient to regard these factors as collectively constituting the basis for position classification. It will be found that





all classification factors of a more detailed character, or their effect, may logically be considered under one or more of these heads.<sup>1</sup>

The type of a classification plan that should be installed in any organization of the public service will depend on:

- (1) Size and type of jurisdiction.
- (2) Number and type of positions.
- (3) Geographic distribution of positions.
- (4) Basic legal provisions.
- (5) Personnel rules.
- (6) Legal interpretations and court decisions.
- (7) Administrative tradition.
- (8) Group and agency attitudes.<sup>2</sup>

However, a certain number of preliminary major steps are required for implementation of the program. They are:

- (1) Selecting the agency to do the work.
- (2) Arranging for finances and staff.
- (3) Determining the positional coverage of the survey.
- (4) Making appropriate contacts for general cooperation of all interested persons, agencies or groups.
- (5) Assembling existing informative material.
- (6) Designing and reproducing a position-description questionnaire and instruction for filling it out.<sup>3</sup>

<sup>1</sup>Op. cit., p. 92.

<sup>2</sup>Isaac Baruch, op. cit., p. 13.

<sup>3</sup>Civil Service Assembly, op. cit., p. 150.





From the above considerations it is apparent that the development of a program is a highly technical job that requires detailed study and considerable time. The selection of the staff is a problem that is of utmost importance, for on the staff will depend the completeness or inadequacy of the program. If there is no one within the organization with the experience necessary to develop and install the plan, it is advisable to secure consultants from the outside. An outside staff should have wide experience in classification, be familiar with techniques, and have a detached and unbiased viewpoint. Even when consultants are employed, it is necessary to provide for continuous administration of the plan, so personnel from within the organization should be assigned to the consultants for assistance and training, for the purpose of developing a staff capable of keeping the plan up to date.

It is the duty of the staff to develop a plan involving the following steps:

1. Arranging and studying questionnaires in organization order and preparing rough pencil charts of organization structure.
2. Arranging questionnaires occupationally.
3. Analysing positions.
4. Determining classes.
5. Determining relationship among classes as to kind of work and level of difficulty and responsibility.
6. Selecting class titles.
7. Preparing working definition of classes.
8. Allocating position to classes tentatively.
9. Conducting work-audits.
10. Revising classes, class titles, allocations of positions to classes.



11. Writing class specifications.
12. Drafting code of rules for the installation and administration of the plan.
13. Clearance of the classification plan for administrative officials, etc.<sup>1</sup>

Generally speaking there are four basic steps used by the staff in setting up the plan. They are as follows:

- (1) Analyzing and recording the duties and other distinctive characteristics of the positions.
- (2) Grouping the position into classes upon the basis of their similarities.
- (3) Writing descriptions of each class of position that will indicate its character.
- (4) Allocating individual positions to the classes described.<sup>2</sup>

The methods used in obtaining the necessary job information data varies with the organization, but are usually obtained from sources in the order listed: (1) questionnaires, (2) interview with employees and supervisors, (3) combination of the above two, and (4) observation by a trained analyst. The particular method used depends on considerations of cost, time, and general practicability. The best data is obtained by interview and observation by trained analysts, but this method is the most expensive and time consuming. Generally,

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<sup>1</sup>Ismar Baruch, op. cit., p. 13.

<sup>2</sup>William E. Mosher, and J. Donald Kingsley, Public Personnel Administration, Harper and Brothers, New York, 1936, p. 361.





the method most frequently employed is the questionnaire. This is of two types--that completed by the incumbent in a position, and that partially completed by the incumbent and partially by the supervisor. Most organizations use the same questionnaire for all positions in the organizations, while some few organizations have a simplified questionnaire for subordinate positions and a detailed questionnaire for supervisory positions. A sample questionnaire for supervisory positions as used by the San Mateo County, California is reproduced here:

SAN MATEO CIVIL SERVICE COMMISSION  
SAN MATEO COUNTY, CALIFORNIA

QUESTIONNAIRE FOR MANAGEMENT POSITION

TITLE OF JOB \_\_\_\_\_ DEPT \_\_\_\_\_

NAME OF INCUMBENT \_\_\_\_\_

1. Describe your job duties, exactly what do you do in your job?
2. What are the specific functions or purposes of the Department in which you work? State who, or what laws, rules, etc., prescribes these functions or duties. Quote authority or attach copy of applicable laws, etc.
3. What functions or work are you, personally, responsible for?
4. To whom are you accountable for the proper discharge of your duties?
5. Who, or what laws, rules, etc., specifies what your duties and responsibilities are? (Quote or attach copy.)
6. Who reviews your work to see that it is properly performed? How often and to what extent is it reviewed?





7. What kind of decisions are you, alone, responsible for, using your own knowledge or judgment? Give recent examples of such decisions and the specific situation.
8. On what kind of problems do you consult with your appointing authority or other persons of authority before you make your final decision?
9. How many employees are you directly responsible for? List by classification and give number in each class.
10. Does your job require you to possess the same kind of professional or technical skill or "know-how" as the employees under your direction? If so, explain why.
11. Which of your duties require the most professional or technical skill?
12. Which parts of your job require the most resourcefulness and initiative? Give illustrations.
13. How do the duties of your job affect the average resident of San Mateo County?
14. What particular segment of the County population is most affected by, interested in or frequently concerned with the functions of the Department or Division in which you work?
15. What tools, machinery or equipment is your job responsible for? State in what way it is responsible.
16. Are you, personally, responsible for the custody, maintenance or protection of any County property of any kind? If so, state specifically the kind of property and extent of your personal responsibility.
17. How long have you held your present job?
18. What education and experience did you have prior to appointment which you believe qualified you for the work? (Note: the purpose here is to help determine the amount of education and experience required for the job.)
19. Does your job require you to maintain official relations, contact or cooperation with other Government officials, County or other? Explain when, how often and with whom the relationship exists.
20. To what extent do your duties require you to deal with the public and in what particular capacity?





Since the primary technique of obtaining information is by means of the questionnaire, written instructions are a necessary supplement to the questionnaire to assure uniformity to presentation of data.

The questionnaire method, when used alone, is inadequate because employees are inclined to overstate the importance of their jobs, or fail to record pertinent data. However, there is an advantage in having selected workers fill out the questionnaires, because this procedure (a) insures a feeling of participation in the study, (b) gives the analyst useful background information, and (c) yields details which otherwise might be overlooked. In any event, whether the interview is used alone or in combination with a questionnaire, it is essential that the foremen and other immediate supervisors be consulted at the outset, so that their knowledge and experience will be utilized and their active participation secured.<sup>1</sup>

After all necessary information is obtained about the positions, class specifications are prepared embodying all of the factors that distinguish one class from another. The specifications are composed of four parts: (1) the class title, (2) the statement of duties and responsibilities, (3) the statement of typical tasks or examples of work performed in positions in the class, and (4) the statement of minimum qualifications.<sup>2</sup> The statement of minimum qualifications should always specify the minimum requirements necessary for the position without any consideration of the special

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<sup>1</sup>Industrial Relations Association of Philadelphia, Salary and Wage Committee, "Salary and Wage Administration," Personnel, May, 1939, pp. 153-54.

<sup>2</sup>Nosher and Kingsley, op. cit., p. 372.





qualifications that the present incumbent of the position may have.

Difficulties and Shortcomings of  
Position-Classification

In using the questionnaire for obtaining information about positions, the information obtained is often undependable for incumbents may try to magnify their own job. Sometimes when incumbents are hired for a certain job but in reality are performing another, they tend to report the job for which hired and completely disregard the work they are performing. In other cases, the employees may misinterpret the instructions and questionnaire, and in some cases are incapable of making a written report of their duties.

Additional shortcomings and difficulties in classifying positions are:

- (1) Getting the incumbent to analyze and report in writing the facts about his position.
- (2) Determining the level of difficulty and responsibility inherent in jobs, particularly those in a class series of positions.
- (3) The use of words that are not definitive enough to have the same meaning to all concerned. For example, the words assists, handles, reviews, etc., will have different meanings for different individuals.





- (4) Failure to disregard personal considerations in describing only "the job"--for example, the particular qualifications of an employee may not determine the specific requirements for the job.
- (5) Failure of supervisors to bear in mind that the work is the subject of analysis, and not the personal performance, ability or characteristics of the employee.
- (6) Studying the position in isolation without regard to relationship with other positions and the organization.
- (7) The public service classification has not concerned itself with job standardization or with the development of unit standards of output.
- (8) Considering the job analysis formula<sup>1</sup> used by the United States Employment Service, the public service classification concerns itself only with the WHAT and HOW of a job, without consideration of the WHY.

#### Keeping Data Current

Since position-classification is a requirement specified by legislative action, it must be kept current even without regard to other considerations. However, it is necessary to look at some of the factors and reasons for keeping the plan

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<sup>1</sup>Supra, p. 48.



current and the descriptions revised to date. The number and nature of the changes required is dependent upon: (1) the completeness of the original classification, (2) the number of positions, (3) the variability of functions and activities, (4) whether changes are made legislatively or administratively, and (5) whether the duties can be changed administratively or whether legislative action is required. The revision of specific position descriptions or specifications becomes necessary under the following circumstances: (1) when new positions are established, (2) when positions are deleted from the organization, (3) when the duties or responsibilities of a position are changed, and (4) when there is a need for changing the qualification standards for the position.

#### Staff Required

In studying the staff requirements it is first desirable to look at the qualifications that the individual members of the staff should possess, and secondly to determine the size of staff necessary for installation and maintenance of the program. The individual qualifications can best be appraised by an examination of the minimum requirements prescribed for different levels of personnel technician in three different public service organizations--The San Mateo County (Calif.) Civil Service Commission, the California State Personnel Board, and The United States Civil Service Commission. The





descriptions that follow are for junior personnel technician in the Civil Service of the San Mateo County, assistant personnel technician with the California State Personnel Board, and the general requirements for analysts in the United States Civil Service Commission.

San Mateo County - Junior Personnel Technician

Minimum Qualifications

Education and Experience: Equivalent to graduation from college and special courses related to public and/or personnel administration; and at least one year of graduate work in subjects closely related to personnel and public administration. Experience in personnel administration may be substituted for graduate college education up to a maximum substitution of one year of the required experience substituting for one year of education. In order to qualify for substitution, such experience should have been in an organized personnel department of a private firm or public agency with a fairly large number of employees.

Knowledge and Ability: Some knowledge of the fundamental and basic principles, and terminology of public and personnel administration; some knowledge of the literature and the current trends in public personnel administration; familiarity with statistical methods; ability to get along well with others; ability to follow oral and written directions; ability to deal successfully with people and gain their respect and confidence; willingness and ability to accept responsibility; ability to use good English ability to dictate correspondence; some knowledge of employment interviewing techniques; ability to write procedures and reports.

State of California - Assistant Personnel Technician

Minimum Qualifications

Either I

One year of experience as a Junior Personnel Technician.

Or II

Experience: Either:

1. Two years of full-time experience in (a) public or private personnel work requiring decisions and responsibilities of greater difficulty than





those involved in timekeeping and personnel recordkeeping; (b) making occupational analyses comparable to those of the United States Employment Service; (c) fulltime placement interviewing (routine interviewing and assisting applicants in filling out employment applications is not acceptable); or (d) technical work in the field of administrative, fiscal, socio-economic, or procedural analysis or research.

or

2. Three years of full-time professional or technical experience in a field requiring a technical education of collegiate grade and involving duties and responsibilities which would develop a comprehensive knowledge of employment requirements of a broad industrial, commercial, or technical field.

and

Education: Equivalent to graduation from college.

(Additional qualifying experience may be substituted for a maximum of four years of the required education on a year-for-year basis.)

In appraising experience, more weight will be given to the breadth of pertinent experience and the evidence of the candidate's ability to accept and fulfill increasing responsibility than to the length of his experience.

and

Knowledges and abilities: Wide knowledge of the principles, techniques, terminology, and procedures of classification, pay, performance reports and such in-service transactions as those listed in the Typical Tasks, and of testing and test construction; wide knowledge of the literature and of the current trend in public personnel administration; working knowledge of the sources of material available for use in the preparation of examinations for the selection of public personnel; working knowledge of and ability to apply the principles and procedures of classification surveys on a departmental or state agency wide basis; skill as an interviewer and ability to appraise candidates' qualifications for employment; skill in performing research work and some knowledge of statistics; ability to make job analyses and write class specifications; ability to prepare written and performance examinations; ability to assist in the administration of a service rating system; ability to explain personnel procedures and adjust complaints; ability to plan and prepare in-service training programs; ability to size up situations and people accurately, and to adopt an effective course of action; ability to deal





successfully with people and to gain their respect and confidence; ability to address large groups of examinees effectively and to get them to follow directions; ability to dictate correspondence, to use good English, and to speak effectively; ability to supervise the work of others, and to get them to work together effectively; ability to ask searching questions and to distinguish significant differences; ability to summarize facts and opinions concisely and accurately and to be alert to details.  
and

Personal characteristics: Integrity, resourcefulness, initiative, patience, tact, adaptability, foresight, open-mindedness, thoroughness, accuracy, poise, good judgment, neat personal appearance, good health, and freedom from disabling defects.

The general qualifications for analysts specified by the United States Civil Service Commission are:

For outside appointment to the position of Position Classifier CAF-5, the entrance level, the individual must attain eligibility on an appropriate competitive Civil Service examination. If an employee is promoted from within to such a position, he must attain eligibility on an appropriate written and oral promotional examination, as supplemented by a personal investigation of his qualifications. In this connection, consideration is given to the employee's ability to express himself verbally and in writing, his ability to meet and deal with others, his alertness and his analytical ability. Three years of general experience (for which education may be substituted) and one year of specialized classification experience are required for promotion to grade CAF-7, the sub-journeyman level. In addition, to the general experience requirement, which remains constant, two years of specialized classification experience are required for promotion to grade CAF-9, the journeyman level for Position Classifiers. More extensive specialized experience is required for promotion to positions above grade CAF-9.

As a generality, it may be stated that a Classification analyst requires experience of at least one year before he is prepared to receive assignments involving the study of the more difficult





and higher level technical positions. As indicated by the promotional requirements, even more extensive experience is ordinarily required before he can perform full journeyman duties satisfactorily.<sup>1</sup>

From the foregoing descriptions of the qualification requirements for analysts by three public service agencies, it is clearly apparent that analysts must possess certain minimum qualifications or be given considerable specialized training to qualify as expert job analysts.

In estimating the size of staff required, it is necessary to consider the number of positions in the organization, and how frequently they are changing. No one rule will apply to all jurisdictions, but some general idea may be obtained from the experiences of other organizations. The San Mateo County Civil Service Commission has one personnel technician to cover approximately 800 jobs in the county. The California Personnel Board employs fourteen personnel technicians and three clerks for the 50,000 jobs within the state. The original San Mateo County survey was made in 1945 and required about six months for completion.<sup>2</sup> The California State survey was made in 1930-31 covering the 20,000 jobs then in existence, and took approximately one year. It is estimated that four

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<sup>1</sup>Reply to Questionnaire by Benjamin Berger, Classification Officer, United States Civil Service Commission, Washington, D. C.

<sup>2</sup>Statement of William L. Goggins, Acting Personnel Director, San Mateo County, 21 March, 1949.





years would be required to do the same survey now for the 50,000 jobs with the present staff.<sup>1</sup>

The Civil Service Assembly estimates that in a relatively stable service or one without an intensive classification plan, the time of one staff member is required for each 2,500 to 5,000 positions. In a changing organization, or one with an intensive program, one staff member is required for each 1,000 to 1,500 employees.<sup>2</sup>

It is further estimated that the time required to develop and install a position-classification plan will vary between three and one-half to six and one-half months per 1,000 employees.<sup>3</sup> The actual length of time will be affected by factors such as the occupational complexity of the service, the geographic distribution of the positions, the technique utilized, and the characteristics of the service. The size of staff required to maintain the plan current after installation is dependent on the stability of the organization and hence the stability of the duties and responsibilities of the program.

#### Cost of the Program

In the public service the budget necessary for a position-classification system is one of the most important factors

<sup>1</sup>Reply to Questionnaire by Clarence L. Burger, Senior Personnel Technician, California State Personnel Board, March, 1949.

<sup>2</sup>Civil Service Assembly of United States and Canada, op. cit., p. 299.

<sup>3</sup>Ibid., p. 158.





affecting the type and completeness of the program that can be established. The same considerations that affect the size of staff also affect the cost. The best budget estimates for a position-classification plan as determined by the Civil Service Assembly are that the annual cost per position is from \$1.00 to \$2.00 for the less intensive type, and from \$4.00 to \$6.00 per position for the more intensive.<sup>1</sup> Favorable conditions will naturally reduce the cost while any combination of unfavorable circumstances will increase the cost. If considerable travel is necessary to obtain job facts the cost will be increased.

#### Uses of Position-Classification

As previously stated, the main objectives of position-classification are to: (1) define the duties and responsibilities, (2) determine the qualifications required, and (3) establish salaries.<sup>2</sup> In actual practice the above are the main uses or benefits that accrue to an organization. However, in other organizations where more intensive types of programs are maintained, various additional uses are reported. They are:

- (1) Establishes uniform terminology for positions.
- (2) Overcomes the limitations of the human mind in not being able to remember a large unorganized mass of information.

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<sup>1</sup>Ibid., pp. 159 and 300.    <sup>2</sup>Supra, pp. 74 and 77.





- (3) Serves as a basis for personnel budget requirements.
- (4) By establishing requirements for jobs facilitates recruitment and selection.
- (5) Provides basis for in-service transfers.
- (6) Establishes basis for evaluating performance of employees.
- (7) Shows need for and type of training required.
- (8) Aids in employee management relations.
- (9) Establishes systematic lines of authority.
- (10) Defines the organization structure.
- (11) Shows weaknesses in the organization.
- (12) Provides basis on which to establish production standards.
- (13) Serves as basis for civil service tests.

#### Summary

Position-classification in the public service, the method of studying and reporting facts about positions, is prescribed by legislative action of the federal, state, county, and city governments for all civil service employees. The classification merely reports facts about positions without any authority to expand or limit the positions. In determining the type of plan that is suited to a particular organization it is necessary to consider size and type of jurisdiction, number of positions, geographic distribution, and the basic legal provisions. Because the development of a plan is a





highly technical job it may be advisable to secure consultants to install the program. The primary methods of obtaining job information are by means of questionnaire and by interview. This procedure often seriously affects the reliability of the information that can be secured. Position-specifications are prepared from the data obtained by questionnaire. In order to comply with the legal provisions, and to have descriptions that are really descriptive of the positions, constant revision is necessary to keep data current. The staff required for installation and maintenance of the program, and the budget required for its maintenance, are determined by the size of the organization and the intensiveness of the program. The primary uses are to define the positions, determine the qualification required, and the salaries paid, but many other uses can be made of the information. The extent of the use made of the data and the benefits accruing to an organization depends entirely on the amount of practical application that is made of the information.



## CHAPTER IV

### JOB ANALYSIS IN THE ARMED SERVICES

#### Introduction

Chapters II and III covered the practices of job analysis in industry and in the public service respectively. These two chapters showed that job analysis is a tool in personnel activities for obtaining information about jobs, which may be utilized for more effective personnel administration and management. Industry and the public service recognized the fact that only through a job analysis program can maximum personnel utilization be achieved and wasteful personnel practices be eliminated. This need also has been recognized by the various branches of the Armed Services as necessary for effective manpower utilization. The need for job analysis in the Armed Forces is even more urgent than that in industry or the public service, for vast numbers of men are employed in a greater variety of complex jobs than are found in any single industry or public service organization. The total number of men in the Armed Forces is over one and a half million with potential expansion to eight or ten million under war conditions. Moreover, in the event of total mobilization of the nation's resources, the Armed Forces may be concerned not only with personnel within the services but also





with the job of every individual in the country. With this prospect, the Armed Forces must be prepared to assume the responsibility for making the most effective use of the nation's manpower. The information necessary for this undertaking and the fulfillment of the responsibility can only be obtained by the systematic and methodical study of each and every job within the Armed Services, both in peace and in war; and secondly, to study the relationship of that job to civilian occupations. Since such information can only be obtained through job analysis, it is necessary to survey the methods and practices of job analysis in the Armed Services for a fuller understanding of the part job analysis is taking in the Armed Forces.

This chapter is devoted to the job analysis programs of the Armed Forces. In presenting the discussion, the material has been divided into four main sections; namely, job analysis in the Navy, Army, Air Force, and the Marine Corps, respectively. Technically, the programs are very similar in that they attempt to get a thorough description of all peacetime and wartime jobs and their relationship to civilian skills, but the detailed programs and techniques vary, being adapted to the specific requirements of the organization and the peculiar nature of the jobs in each service. Since the Coast Guard is part of the Armed Services of the United States, and in time of war operates as part of the Navy, the program of the Navy will be considered in greater detail than the programs of the other services.





## Job Analysis in the Navy<sup>1</sup>

### Development of the Program

Prior to World War II, some analysis of the jobs in the Navy had been made, but this was done in an uncoordinated and haphazard manner. All the work that had been done was on some ship or station in an attempt to solve some local problem. Consequently, when war was declared the Bureau of Naval Personnel had practically no information catalogued describing each billet. According to Jewett,<sup>2</sup> available data consisted of billet titles and did not include job descriptions which would provide valuable information to personnel charged with selection and detailing. With rapid expansion of mobilization and development of complex equipment, regular officers could not be expected to keep up with these new developments and reserve officers had no information upon which to base decisions involving selection, detailing, training, and promotion. To alleviate this situation the Secretary of the Navy and the Chief of Naval Personnel requested the assistance of the firm of Booz, Fry, Allen, and Hamilton to

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<sup>1</sup>Except where otherwise indicated, this section is based on correspondence with and on replies to questionnaire furnished by Mr. D. G. Price, Head, Billet and Qualifications Branch, Research Division, Bureau of Naval Personnel, Navy Department, Washington, D. C.

<sup>2</sup>Cdr. G. W. Jewett, Jr., Developments in Officer and Enlisted Billet Analysis and Qualification Research, Abstract of Personnel Training Course for Reserve Officers. Held in BuPers 15 June - 20 June, 1947, Bureau of Naval Personnel (Unpublished) September, 1947.





make a comprehensive survey of the functions, objectives, and organization of the Bureau of Naval Personnel. Their report stated the need for a comprehensive job analysis program in the Navy.

In the autumn of 1943 a program of job analysis was established in the Bureau of Naval Personnel. Two staffs were organized, one to study the billets of officers, and the other to study the billets of enlisted men. The former staff, called the Officer Billet Analysis Section, was established in the Shore Establishment Section. The latter staff, called Enlisted Billet Analysis Section, was established under the Standards and Curriculum Division of the Training Activity.

The Officer Billet Analysis Section developed catalogs of officer billets for naval districts, staffs, and ships. The Enlisted Billet Analysis Section developed several types of studies, chief among which were studies of naval ratings and studies of ships. The studies of naval ratings were undertaken with a long-range view toward a comprehensive analysis of the work of each naval rating. Such studies were eventually to provide a complete sampling of billets in each rating, including all pay grades and all types of ships and stations. The studies of ship types were to analyze all the billets on one type of ship. Such studies were based upon the complement of that ship type and upon typical organizations of duty assignments. Specifications were prepared for certain types of vessels. Among these were studies of APA's,





destroyers, destroyer escorts, submarines, and cruisers. The specifications usually included descriptions of billets, together with statements of usual rates assigned and performance requirements. In addition, typical bills listing battle, emergency, watch, and routine duties were included.

Although considerable information was collected and a number of ship-type specifications were published, only a beginning had been made in analyzing the jobs in the Navy. However, a beginning had been made, but what was more important, techniques and methods were developed and were tested under actual operating conditions.

With the cessation of hostilities and the consequent reorganization, a Research Division was established in the Bureau of Naval Personnel, where all research within the Bureau was to be concentrated in order to prevent duplication and where proper direction could be provided for the work. On 1 January, 1946 the Officer Billet Analysis Section and the Enlisted Billet Analysis Sections were placed in the Research Division, where they are currently known as the Billet and Qualifications Research Branch. This assures that the work begun during the war will be continued.

The mission of the Billet and Qualifications Research Branch is to conduct investigative studies into naval occupations and to develop tools for carrying out such personnel administrative functions as recruitment, classification, training, advancement in rating, detailing, mobilization planning, and wage and salary administration.





In accomplishing its mission this Branch prepares occupational analysis manuals and other personnel publications, and develops various techniques and devices, such as personnel rating structure and conversion tables to translate military needs into civilian labor market terminology. All such instruments are developed from basic occupational data obtained through the analysis of naval officer and enlisted jobs at naval stations and aboard ships.

The Head, and Assistant Head, of the Branch plan, direct, and administer the program. Serving directly under them are two "Projects Supervisors" who direct teams of research analysis in gathering and synthesizing job information, either in the central office or in the field. One Project Supervisor directs those occupational research projects concerned with officers and the other Projects Supervisor directs those concerned with enlisted personnel. Each team of analysts is headed by a civilian or military "Group Supervisor" who directs the personnel of his team, in the execution of one research project. Editorial help in the preparation of job analysis studies for publication is provided by the Editor of the Branch.

The Billet and Qualifications Branch has the benefit of technical guidance from several sources in the carrying out of its job analysis functions. In the first place, users of job analysis publications render invaluable service in reviewing specifications to insure that they are technically





accurate. Other government agencies, such as the U.S. Employment Service and the Manpower Utilization Branches of the Army and Air Force, furnish the Billet Analysis Branch with their recent publications as an aid in developing new techniques or providing information of particular value in the execution of the program. The Dictionary of Occupational Titles and various compilations of jobs in specific industries published by the U.S. Employment Service serve as a basic guide in the development of the Navy billet analysis and classification system.

In addition, this Branch has the benefit of expert advice and opinion from the Civilian Advisory Committee to the Chief of Naval Personnel. The membership of this Committee consists of men holding important positions in the field of personnel administration, psychology, vocational guidance and education. This Committee has followed the progress of the job analysis program very closely, has advised on the proper format for job descriptions, and has made recommendations to the Chief of Naval Personnel which are designed to insure that job analysis and occupational research will be continued and expanded in the future, both in peacetime and wartime.

It should be unnecessary to point out but it cannot be sufficiently emphasized that the success of future mobilization may be directly related to the adequacy of job analysis studies now being made. Consequently, the goal of the Analysis





Branch is to have eventually a complete analysis of every naval officer and enlisted billet in both the peacetime and wartime Navy.

#### Analysis Technique

Considering the development of the billet analysis program in the Navy, it is only natural that the techniques and methods employed should undergo gradual change. However, the original format for the analysis and specifications has not changed materially. The main change has been toward standardization of the technique and adoption of standard forms to obtain uniformity in gathering information.

At the present time, the study of naval jobs is divided into the following types of surveys: (1) studies of a group of jobs on an organizational basis, (2) studies of a group of jobs related on a functional basis without regard to the particular organization, (3) study of specific individual jobs concerning which information is desired.

Analyses are made "on location" by trained personnel technicians of the Bureau of Naval Personnel and by enlisted technicians trained and operating under Bureau supervision. The methods employed are: (1) preparation of a questionnaire by the person occupying the job; (2) an interview conducted by the analyst with the person occupying the job; (3) observation of the job incumbent in the performance of his duties, particularly in skilled trades or such equivalents as technical operators of special equipment; (4) review of the





analyst's findings by the incumbent's supervisor; (5) estimate of qualifications by the analyst. Analyses are recorded on special forms called "Naval Job Schedules" which have been developed by professional personnel at the Bureau over a period of years and with the advice of several leading industrial analysts.

Essentially the same procedure is used on all billets, including the billets held by officers of all ranks through captain. More reliance, however, can be placed on questionnaires obtained from workers in high level jobs as they are filled out more intelligently. In top management jobs more emphasis is placed on responsibility, authority, and administrative techniques.

For single isolated jobs in scattered geographic areas or other instances where "on location" interviews are not economically advisable, a detailed questionnaire form with explanatory material and samples containing the principal elements of the complete "on location" analysis form are forwarded to the command for preparation by the job incumbent and for post-audit and review by the proper person in the chain of command.

To permit gathering of information vital to effective naval manpower utilization, it is necessary not only to have the full cooperation of the officers and men in the billets being studied but also the full cooperation and support of those in command of the activities where the studies are





being made. If job analysis is linked with any attempt to evaluate personnel, organizational structure, or assignments to duty, the necessary cooperation may not be fully established. Accordingly, the Bureau of Naval Personnel has adopted certain policies and all technicians engaged in job analysis studies are required to comply with them. The policies are:

(1) It is, in no degree whatsoever, the purpose of this program to gauge the total personnel needs of the naval activities visited or to evaluate the organization or the quality of the work performed. The analyst does not concern himself with how well the worker does his job, nor does he concern himself as to whether the proper man was assigned to the job, nor whether there should be such a job established. He represents the Research Division of BuPers, not the General Inspector.

(2) All billet analyses will be cleared by the commanding officer concerned for approval by him before any papers are transmitted to the bureau. Frequently, the commanding officer will detail this approving authority to some subordinate.

(3) It is important that the division officers, or officers-in-charge, be given an opportunity to review and comment upon the accuracy and completeness of job analysis schedules covering the billets under their cognizance prior to the commanding officer's review. If, for any reason, it is not possible for this review to be made by the division officer, completed schedules should nevertheless be cleared through the commanding officer or his deputy.

(4) The commanding officer of each ship or station should be informed that he will receive, at some future date, copies of all job specifications, rating specifications, and other publications based on the job analyses prepared at the naval activity under his command. These publications will be distributed, when printed, by the Bureau of Naval Personnel.

(5) Because material prepared by personnel technicians under bureau auspices might be construed to be an authoritative basis for some personnel action, analysts will not leave copies of Naval





Job Schedule (NavPers-2497) or of Naval Job Physical Requirements (NavPers-2499) at the ship or station. It is reasonably certain that the command on board at the time of survey will understand the use which such schedules would have in the organization. However, subsequent commands, not being fully aware of the limitations of these surveys might overestimate their value. By not leaving schedules, no problem will come up about their use until they have been processed into valid specifications or other personnel administrative instruments and are approved by the Chief of Naval Personnel, CNO, or SecNav as a basis for action. Duplicate copies of Naval Job Analysis Questionnaire (NavPers-2496) may be left if desired by the command, since these forms will have been prepared by personnel of the activity.

(6) Analysis will be made of billets held by enlisted personnel in all pay grades and of officers of all ranks through Captain. Analyses of billets occupied by officers of Flag Rank will not be included in studies unless specifically ordered.<sup>1</sup>

Prior to the arrival of the job analysis team or as a first step in the procedure when an analysis is started, questionnaires are distributed to the officers and enlisted men whose jobs are to be studied. Customarily, it is the responsibility of the station Personnel Officer to distribute and collect the questionnaires for presentation to the Group Supervisor upon arrival at the station. The Group Supervisor then sorts out the questionnaires by departments and assigns analysts to each department, the number assigned to a department depending on its size.

After the questionnaires have been reviewed, the analysts interview and observe the men in the performance of

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<sup>1</sup>U.S. Navy Department, Bureau of Naval Personnel, Manual of Instructions for Naval Occupational Analysis, NavPers 15,803, Bureau of Naval Personnel, Washington, D.C., 1949, pp. 7-8.





their duties. Under normal conditions it is expected that each analyst will complete one interview and one schedule per day at the minimum with a better rate of production as the study progresses. Job schedules are reviewed by the Group Supervisor and, if necessary, the analyst makes revisions or re-interviews the job incumbent.

The Group Supervisor obtains, or draws up, organization and work flow charts of the station. When all the schedules have been completed and approved, it becomes the duty of the Group Supervisor to clear them with the head of each department and with the Commanding Officer. After final clearances have been made the study is considered completed and the group returns to the central office at the Bureau of Naval Personnel to prepare billet specifications.

An integral part of any job analysis is the completion by the analyst of the Physical Demands form developed by the Billet and Qualifications Research Branch. This form has been devised with the assistance of the Bureau of Medicine and Surgery and is designed to provide a systematic system of physical profiling of jobs.

In conducting the survey the forms utilized are:

- (1) Naval Job Analysis Questionnaire, NavPers 2496;
- (2) Naval Job Analysis Schedule, NavPers 2497;
- (3) Naval Job Physical Requirements, NavPers 2499.

After job information is obtained in the preceeding forms, a billet specification is prepared for each job.



The following is a basic format that has been developed for preparing a billet specification:

# BILLET TITLE

ALTERNATE TITLE: (if any)

OFFICERS QUALIFICATIONS CODE: {  
or  
ENLISTED NAVY JOB CLASSIFICATION CODE: { as applicable

LOCATION OF BILLET

QUALIFICATIONS:

RANK or RATE: as applicable

TEST SCORE PATTERN

OFFICER CLASSIFICATION TEST {  
or  
NAVY BASIC TEST BATTERY { as applicable

Test

Cutting Score (NSS)

(List tests and cutting scores)

Physical Demands

Age:

Other factors:

PERSONAL CHARACTERISTICS

EDUCATION AND EXPERIENCE

Schools and Courses

Minimum:

Desirable:

Naval Background

Minimum:

Desirable:





Civilian Background

Minimum:

Desirable:

BILLET SUMMARY

(brief summation of essential functions of job)

MACHINES, EQUIPMENT, TOOLS AND MATERIALSWORKING CONDITIONSNAVAL BILLET RELATIONSHIPS (within the Command)

Promotion from: (

Promotion to: (

Transferable to or from: ( as applicable

Billet Combination: (

Billet breakdown: (

PROCUREMENTS SOURCES:

PRIMARY: (by industry)

JOBS: (within the industry)

SECONDARY: { to be included if logical secondary  
procurement source exists

JOBS:

CIVIL READJUSTMENT INFORMATION:

This billet provides qualifying background for the following positions in:

U. S. Federal Civil Service

(List appropriate Civil Service jobs)

Public and private agencies and industries

(Titles and codes from Dictionary of Occupational Titles, Department of Labor)





(List appropriate jobs from Dictionary  
of Occupational Titles)

Examples of the completed forms as actually made and reported by the Bureau of Naval Personnel and the resulting billet specification prepared from the information obtained on the forms, are shown for two different naval billets, to indicate the type and variety of information obtained for even relatively simple jobs.



NAVAL JOB ANALYSIS  
QUESTIONNAIRE  
NAVJERS-20/44 (REV. 8-46)

110  
(Read instructions below)

DATE 9 February, 1948

|   |   |  |                                |  |
|---|---|--|--------------------------------|--|
| IDENTIFICATION INFORMATION              | JOB TITLE<br><b>SUPERVISOR OF PLUMBING SHOP</b>                                     |  |                                |  |
|   | NAME OF SHIP OR STATION<br><b>U. S. N. DISCIPLINARY BARRACKS - WORKS DEPARTMENT</b> |  |                                |  |
|   | DIVISION<br><b>MAINTENANCE</b>  |  | SECTION<br>                    |  |
|   | SHIP TYPE AND CLASS<br>   |  | BATTLE STATION (If any)<br>    |  |
|   | NAME (Last)<br><b>LITIZZETTE, JOSEPH JR.</b>  |  | NAME (First)<br><b>(N)</b>     |  |
|   | NAME (Middle)<br>   |  | RANK OR RATE<br><b>CSF</b>     |  |
|   | FILE OR SERIAL NUMBER<br><b>368-31-86</b>   |  | MONTHS ON JOB<br><b>1 WEEK</b> |  |
| YOUR PHONE EXTENSION<br><b>262</b>      |   | IMMEDIATE SUPERVISOR'S NAME<br><b>LEININGER</b>      |                                |  |
| SUPERVISOR'S RANK OR RATE<br><b>LT.</b> |   | SUPERVISOR'S JOB TITLE<br><b>MAINTENANCE OFFICER</b> |                                |  |

B. LIST OF DUTIES

1. List your duties and explain how you do them

Time spent

7 hours

Supervision of Plumbers

Maintenance of Plumbing

Steam and Refrigeration

2. What is the purpose of this job?

To supervise plumbers work-  
ing on job orders pertaining  
to maintenance, upkeep and  
construction.

3. What equipment do you use? (List machines, instruments, which you  
operate or must know how to operate to carry out your duties)

Manual and power threaders,  
machine lathe, drill press,  
electric grinder, oxyacetyline  
welding outfit and necessary hand  
tools.

INSTRUCTIONS: Enter answers for all sections contained on this form as completely as possible. If there is insufficient space in any section, continue answers, identified by section and item number of questionnaire, in item H, Additional Comments, or you may use a plain sheet of paper.





|  |  |  |
|--|--|--|
|  | Plumbing shop  | 20 prisoner plumbers   |
| 3. DEGREE OF DIFFICULTY OF WORK  | Moderate   | Knowledge of civilian plumbing and piping                                    |
| 4. A. LIST OF ONE NECESSARY TO ACCOMPLISH THE JOB<br>B. NAVAL EXPERIENCE: Give types of duty offering qualifying background, listing job titles and desirable length of time.<br>C. CIVILIAN EXPERIENCE: Give job titles and approximate amount of time on job.                | Shipfitter 3rd and 2nd<br>Shipfitter 1st and chief<br><br>Repair ships, cruisers, aircraft carriers, and battle-ships. Chief shipfitter - 3 years. | High and vocational schools<br><br>Plumber - 4 years<br>Pipefitter - 3 years |
| 5. LIST THE TYPES OF CIVILIAN JOBS REQUIRING QUALIFICATIONS SIMILAR TO THOSE FOR THIS POSITION. IF POSSIBLE, GIVE SPECIFIC NAME OR TITLE OF JOB, GOVERNMENT AGENCY, COMMERCIAL OR INDUSTRIAL ORGANIZATION WHERE SUCH JOBS MAY BE FOUND. (As, Merchandise Manager, Dept. Store) | Plumber, pipefitter - general  |  |
| 6. REMARKS   | I have been on this duty one week so the answers are not as complete as they could be if I had been here longer.                                   |  |





## A. IDENTIFICATION INFORMATION

|  |                           |   |
|--|---------------------------|---|
| 1. JOB TITLE<br>Supervisor, Plumbing Shop                          |                           | SCHEDULE NUMBER<br>NPCS-83  |
| 2. ALTERNATE TITLE<br>None   |                           | DATE<br>3/5/48  |
| 3. NAME<br>Litiizzette, Joseph Jr.                                 | 4. RANK/RATE<br>CSF       | ANALYST<br>Huntley  |
| 5. SHIP OR STATION<br>Disciplinary Barracks, San Pedro, California |                           | REVIEWER<br>(Editorial use only)  |
| 6. TYPE<br>-   | 7. CLASS                  | 8. SHIP <input type="checkbox"/> IN PORT <input type="checkbox"/> UNDER WAY |
| 9. DIVISION<br>Works   | 10. BRANCH<br>Maintenance |   |
| 11. SECTION<br>Plumbing shop                                       | 12. UNIT                  |   |
| 13. SUPERVISOR'S NAME<br>Jack Leninger                             |                           |   |
| 14. JOB TITLE OF SUPERVISOR<br>Maintenance Officer                 |                           |   |

## B. JOB SUMMARY

Supervises activities of Plumbing Shop in Maintenance Branch of Works Division. Directs operation of all new plumbing installation, sprinkling systems and sewer, steam and water systems. Oversees all repair work and upkeep on steam and refrigeration systems, drain and supply lines. Directs on the job training of prisoner personnel assigned to Plumbing Shop.

## C. DESCRIPTION OF DUTIES

- I. Oversees repair activities in outside upkeep and installation work of plumbing, steam and sewerage systems.
  1. Receives job orders from Maintenance Officer concerning requests for repair or installation work.
  2. Surveys each job for which request has been approved, ascertains equipment and men needed for working job to completion.
  3. Details men for job and supervises each installation or repair job. Insures that proper equipment and methods are used.
  4. Makes routine inspections of sprinkler system water softening plant, sewer pump system, pipe lines of refrigeration plant, gas meter and water meter room, and water reservoirs.
  5. Makes verbal report to Maintenance Officer concerning inspections and arranges for repair of malfunctions.



## C. DESCRIPTION OF DUTIES CONT.

II. Directs on the job training of Personnel assigned to shop.

1. Assigns prisoner personnel to specific job details and maintains continuous rotation of assigned personnel to insure adequate training in all phases of work experience offered by Plumbing Shop.

2. Instructs newly assigned personnel in safety procedures and safety precautions regarding use of machinery in Plumbing Shop and operation of devices peculiar to plumbing trade, such as electric "eels." (Electrical augers for clearing pipe lines and fittings that cannot be reached by any other means.

III. Submits routine reports to Works Office through Maintenance Officer.

1. Submits daily report of work performed, listing information such as parts installed, installation work completed on new construction work, and man hours involved, to Maintenance Officer.

2. Submits weekly compilation of daily reports to Maintenance Officer.

3. Submits monthly report of manufacture of parts, repair work, installation work, total man hours used and information on conduct, attitude and ability of each prisoner.

## D. MACHINES, EQUIPMENT, MATERIALS AND TOOLS EMPLOYED

1. Machinery or Equipment with which incumbent must be familiar

Lathes, drill presses, hand tools  
power tools, welding equipment.

2. Materials worked on

Metal pipe, sewer pumps, water softners, plumbing fixtures joints, fittings, washing machines steam-lines.

3. Machinery or Equipment operated, serviced, installed or repaired

Lathes, hand tools, drill presses,  
and welding equipment.

4. Tools, Books or Publications used

Pipe threaders, both electric and manual operated. Civilian books and pamphlets issued by plumbing equipment firms.





Close, over 19 General Court  
Martial Prisoners.

Moderate, Maintenance Officer.

Thorough knowledge of construction and maintenance of drain and supply lines of steam, water and sewage systems. Working knowledge of power and hand tools, oxy-acetyline welding, all types of fittings and gaskets common to plumbing installation and maintenance.

Patience, desire to assist in the rehabilitation of prisoner personnel  
Personal motivation for duty in a Naval place of confinement.

3. Education and Experience

1. Naval Schools and Courses

Class "A" Shipfitter School.

Courses in machine tool, plumbing operation.

2. Naval Schools and Courses

Advanced courses in plumbing maintenance, power tool operation.

3. Naval Schools and Courses

High school graduate, vocational course.

4. Naval Schools and Courses

Vocational course in plumbing, pipe line maintenance

4-6 years as member of plumbing or shipfitter crew on large ship or shore station.

5. Naval Schools and Courses

Considerable, as member of shipfitter crew, with supervisory duties on large ship or tender involving varied work with plumbing and fitting repair.

Moderate, as apprentice plumber in large firm doing general and commercial plumbing work.

Moderate to considerable work as journeyman or master plumber.





4. SIGNIFICANT TESTS

GCT, MAT, MK(M), MK(E).

5. PREFERRED MARK OR RATE

CSF

6. AGE PREFERRED

28-50

7. GENDER PREFERRED

☒ MALE☐ FEMALE☐ EITHER

8. ORGANIZATIONAL RELATIONSHIP

Promotion From: None.

Promotion To: Assistant to Maintenance Officer

Interchangeability: Supervisor, Metalsmith Shop.

PROCEDURE SOLUCES

1. INDUSTRIES

Plumbing manufacturing companies, Construction Firms.

2. BS

Plumber, foreman; plumber, maintenance.

9. CIVILIAN PLACEMENT INFORMATION

Plumber Apprentice, (const)

Plumber Foreman, (const)

Plumber Helper, (const)

Plumber Maintenance, (const)

Pipe Fitter, (const)

Pipe Fitter, Ammonia, (const)

Pipe Fitter, Sprinkling system,  
(const)

Steam Fitter, (const)

10. GLOSSARY

11. COMMENTS



DATE June 23, 1948

NAVAL JOB TITLE Supervisor, Plumbing Shop

SCHEDULE NO. NPCS-83

Assess the applicability of each element to the particular naval job under consideration. Enter as remarks only brief and factual description of factor checked.

| ENVIRONMENTAL FACTORS |    | REMARKS   | FUNCTIONAL FACTORS |  | REMARKS  |  |
|-----------------------|----|---|--------------------|--|--|--|
| X                     | 1  | 35% in plumbing shop<br>65% outside and in other<br>Bldgs making installations  | 3                  | HEAVY LIFTING<br>40-100 LBS.                               |  |  |
| X                     | 2  |   | 31                 | MODERATE LIFTING<br>10-40 LBS.                             | Pipe, equip. and tools.                            |  |
|                       | 3  |   | 32                 | LIGHT LIFTING<br>5-10 LBS.                                 |  |  |
|                       | 4  |   | 33                 | HEAVY CARRYING<br>40-100 LBS.                              |  |  |
|                       | 5  |   | X 34               | MODERATE CARRYING<br>10-40 LBS.                            | Pipe, equip. and tools.                            |  |
|                       | 6  |   |                    | 35   | LIGHT CARRYING<br>5-10 LBS.                        |  |
|                       | 7  |   | X 36               | WALKING  | In shop area; making<br>inspections and repairs    |  |
|                       | 8  |   | X 37               | STANDING   | instructing, inspecting<br>and supervising repairs |  |
|                       | 9  |   |                    | 38   | CRAWLING   |  |
|                       | 10 |   |                    | 39   | KNEELING   |  |
| X                     | 11 | Ammonia gas from re-<br>frigeration pipe lines                                  | 40                 | FULL BODY TWISTING   |  |  |
| X                     | 12 |   | 41                 | FULL BODY HAUL<br>Veh Haul                                 |  |  |
| X                     | 13 |   | 42                 | POURING  |  |  |
| X                     | 14 | Lubricating machinery   | 43                 | HEAVY HAND ARMING<br>100 LBS.                              |  |  |
|                       | 15 |   | X 44               | OPERATING<br>HAND TOOLS                                    | Operating machinery,<br>using hand tools           |  |
| X                     | 16 | Contact with power leads  | X 45               | MAKING<br>INSTALLATIONS                                    | Making installations                               |  |
|                       | 17 |   | 46                 | REPAIRING<br>ELECTRICAL                                    |  |  |
|                       | 18 |   | 47                 | REPAIRING<br>MECHANICAL                                    |  |  |
|                       | 19 |   | 48                 | REPAIRING<br>ELECTRICAL                                    |  |  |
|                       | 20 |   | 49                 | REPAIRING<br>MECHANICAL                                    |  |  |
|                       | 21 |   | 50                 | OPERATION OF HAND<br>TOOLS, TRAILERS<br>OR MOTOR VEHICLE   |  |  |
|                       | 22 |   | 51                 | ABILITY TO<br>MENTAL AND PHYSICAL<br>ADAPTATION            |  |  |
| X                     | 23 | Using pneumatic riveter<br>Instruction and close<br>supervision of 15 prisoners | 52                 | ABILITY TO<br>READ SMALL PRINT<br>IN VARIOUS<br>SITUATIONS | Capacity for reading<br>small print                |  |
| X                     | 24 |   | X 53               | CLOSE<br>INSPECTION WORK                                   | Close inspection work                              |  |
|                       | 25 |   | 54                 | REPAIRING<br>ELECTRICAL                                    |  |  |
|                       | 26 |   | X 55               | REPAIRING<br>MECHANICAL                                    | Recognize pipe line<br>markings                    |  |
|                       | 27 |   | 56                 | ABILITY TO<br>HEAR THE<br>SPOKEN VOICE                     | Ability to hear the<br>spoken voice                |  |

Duties of this billet are performed under conditions of close confinement, within area enclosed by high wall, behind lock and guarded gates.





## SUPERVISOR, PLUMBING SHOP

ENLISTED NAVY JOB CLASSIFICATION CODE: 4222073LOCATION OF BILLET: Naval Disciplinary Barracks, Works Department, Maintenance DivisionQUALIFICATIONS

RATE: Chief Pipe Fitter (FPC)

## TEST SCORE PATTERN

## NAVY BASIC TEST BATTERY

| <u>Test</u>                       | <u>Cutting Score (NSS)</u> |
|-----------------------------------|----------------------------|
| General Classification Test.....  | 50                         |
| Arithmetic.....                   | 45                         |
| Mechanical.....                   | 45                         |
| Clerical Aptitude.....            | --                         |
| Radio.....                        | --                         |
| Combination Scores: GCT, ARI..... | 95                         |
| ARI, MECH.....                    | 95                         |
| GCT, CLER.....                    | --                         |

PHYSICAL DEMANDSAGE: Minimum of 25.

Other factors: Work requires contact with greases and oils used in lubricating machinery, and exposure to ammonia gas from refrigeration pipe lines and electrical energy from power leads; capacity for lifting and carrying moderately heavy objects such as pipe and tools weighing 15 to 45 pounds; ability to do considerable walking and standing in instructing, performing repairs





and inspecting maintenance needs and work of prisoners; full use of fingers and both hands in making repairs and installations, operating machinery, and using various hand tools; visual acuity sufficient to accomplish close inspections, read sketches and blueprints, as well as ability to distinguish basic colors in reading charts and recognizing pipe line markings; ability to speak clearly and hear distinctly in supervising, lecturing, and instructing others.

#### PERSONAL CHARACTERISTICS

Maturity and independent judgment sufficient to conduct on-the-job training in vocational rehabilitation; ability to judge the quality of workmanship or material; capacity for clear oral and written expression of thought; motivation for duty in naval places of confinement; must have clear civilian and navy police record.

#### EDUCATION AND EXPERIENCE

##### Schools and Courses

**Minimum:** Courses in trade school in plumbing or pipefitting; completion of class A pipe-fitter school.

**Desirable:** High school graduate, vocational course in plumbing; completion of advanced courses in plumbing maintenance, power tool operation.



Naval Background

Minimum: Considerable experience as member of plumbing or shipfitter crew on large ship or shore station.

Desirable: Moderate experience as member of shipfitter crew with supervisory duties on large ship, repair ship or tender, involving varied work with plumbing or pipe fitting repair.

Civilian Background

Minimum: Completion of two years of plumbing apprenticeship, or experience as member of plumber maintenance crew for plant or contracting firm.

Desirable: Moderate experience as licensed plumber, performing work on journeyman level, with supervisory responsibility for work of others.

BILLET SUMMARY

Supervises prisoners assigned to plumbing shop for vocational rehabilitation. Directs continuous on-the-job training and instruction and oversees all plumbing shop and installation work performed in maintenance and new construction.

DESCRIPTION OF DUTIES

1. Instructs prisoners in plumbing shop operations and techniques.





Demonstrates to prisoners use of machinery and hand tools common to the trade for cutting and connecting pipes, sealing joints, and repairing and installing gas and water pipes, toilet equipment, sinks, laundry equipment, gas ranges, and all accessories and fittings. Explains principles to be followed in reading blueprints and sketches.

Assigns prisoners to specific job details such as cutting, reaming, and threading pipe and caiking joints, maintaining rotation of assignment to insure adequate training in all phases of work experience offered by plumbing shop. Inspects work in progress, making corrective suggestions and explaining reasons for using certain techniques and methods to advance efficiency and skill of prisoners.

Instructs newly assigned personnel in safety procedures and precautions to be observed in operating such machinery as electric hand drill, hacksaw, pneumatic riveting hammer, and pipe bending machine.

2. Oversees plumbing repair crew in upkeep and installation work for Disciplinary Barracks.

Receives job requests from Maintenance Officer for repair or assembly and installation of air, gas, water or waste disposal system. Surveys each job for which request has been approved, ascertaining equipment and number of men needed to complete work. Details men and





closely supervises all phases of work, insuring that proper equipment and approved methods are used.

Makes periodic inspection of sprinkler system, water softening plant, sewer pump system, pipe lines of refrigeration plant, gas and water meter room, and water reservoir to determine that equipment is in operating condition. Reports orally to Maintenance Officer concerning inspections and arranges for repair of damaged parts.

3. Prepares and forwards reports covering work accomplished and prisoner manner of performance.

Submits following reports to Maintenance Officer: (1) Daily report of work performed, listing information such as parts installed, installation work completed on new construction projects, and man-hours expended; (2) weekly compilation of daily work reports; (3) monthly report of parts manufactured, repair and installation work, total man-hours expended, and information on conduct, attitude and ability of each prisoner.

#### MACHINES, EQUIPMENT, TOOLS AND MATERIALS

Consults and must be familiar with books and pamphlets issued by civilian plumbing equipment firms; operates electric hand drill, hacksaw, pneumatic riveting hammer, pipe bending machine and hand tools common to plumbing trade.



WORKING CONDITIONS

Inside plumbing shop 35 percent of time; 65 percent of time outside and in other buildings, supervising repair and installation crew.

RELATED NAVAL OCCUPATIONS

Maintenance Officer

Supervisor, Metalsmith Shop

PROCUREMENT SOURCESPRIMARY

Any construction company

Jobs: Plumber foreman; plumber; pipe fitter

SECONDARY

Any industrial firm

Job: Maintenance man

Vocational education

Job: Trade school instructor

Any construction company

Job: Plumber apprentice

CIVIL READJUSTMENT INFORMATION

This billet provides qualifying background for the following positions in U. S. Federal Civil Service.

- |  |           |
|--|-----------|
| 1. General Mechanic Series             | CPC-341-0 |
| 2. Building Maintenance Series         | CPC-321-0 |
| 3. Construction and Maintenance Series | CPC-329-0 |
| 4. Plumbing Series                     | CPC-375-0 |





- |   |           |
|---|-----------|
| 5. Refrigeration Mechanic Series              | CPC-382-0 |
| 6. Steamfitting and Pipefitting<br>Series     | CPC-389-0 |
| 7. Superintendence (General Crafts)<br>Series | CPC-391   |

Public and private agencies and industries (titles and codes from Dictionary of Occupational Titles, Department of Labor)

- |                                 |          |
|---------------------------------|----------|
| 1. Plumber (I)                  | 5-30.210 |
| 2. Plumber (II)                 | 5-30.260 |
| 3. Gas-Main Fitter              | 5-30.025 |
| 4. Mechanical Supervisor        | 5-83.621 |
| 5. Maintenance Man Building     | 5-83.611 |
| 6. Pipe Fitter, Maintenance     | 5-30.010 |
| 7. Steam Fitter                 | 5-30.410 |
| 8. Pipe Line Foreman            | 5-94.020 |
| 9. Sewer and Waterworks Foreman | 5-94.180 |





2/20/48

|                         |          |                   |     |
|-------------------------|----------|-------------------|-----|
| INSTRUCTOR SIGNAL CLASS |          |                   |     |
| RETRACOM MINSY          |          |                   |     |
| EDUCATION               | FOUR     |                   |     |
| SHORE DUTY              |          |                   |     |
| FEUER                   | FREDRICK | (N)               | SMI |
| 262-76-63               | I        | 2685              |     |
| Mr. B. R. DEATON        | LT. USN  | EDUCATION OFFICER |     |

Visual communications instructor

80%

Watch stander

20%

As instructor. Instruct retrainees in the use of visual communications the equipment used and how to use it.

As watch stander, Maintain a security watch in the education building.

To enable retrainees to learn visual communications or brush up on what they have already learned before being restored to duty.

Lights, semaphore flags, alphabet flags, special flags, and pennants, and all available publications that can be obtained pertaining to communications.

Enter answers for all sections contained on this form as completely as possible. If there is insufficient space in any section, continue answers, identified by section and item number of questionnaire, in item 7. Additional comments, if you may use a plain sheet of paper.



|  |  |
|--|--|
| <p>Communication Division</p> <p>Navigation Division</p>   | <p>Class varies from one to eight personnel</p>  |
| <p>General from C.O. and X.O.</p> <p>Moderate from division officer</p>  | <p>Reading of light, semaphore, and flaghoist--their procedures and use of signal publications</p> |
| <p>At least a high school course.</p> <p>Completion of all signalmen and quartermaster courses from seaman 1c to Chief SM or QM and experience equivalent to 8 years service.</p>                | <p>High school education (minimum)</p> <p>Boy scout communications</p>                             |
| <p>Duty aboard all types of ships of the line as striker and junior signalman. At least two to three years as supervisor of the watch, and at least one year as senior or leading signalman.</p> | <p>There is no civilian experience will qualify a man for this job.</p>                            |
| <p>Western Union operator, Government Communications</p>   |  |





| A. IDENTIFICATION INFORMATION   |          |   |   |
|---|----------|---|---|
| 1. JOB TITLE<br><b>VISUAL COMMUNICATIONS INSTRUCTOR</b>                   |          |   | SCHEDULE NUMBER<br><b>NPCM-111</b>            |
| 2. ALTERNATE TITLE  |          |   | DATE<br><b>3-22-48</b>                        |
| 3. NAME<br><b>FEUER, FREDERIC</b>   |          | 4. RANK/RATE<br><b>QMI</b>  | ANALYST<br><b>GANTLEY</b>                     |
| 5. SHIP OR STATION<br><b>USN RETRAINING COMMAND, M.I., VALLEJO, CALIF</b> |          |   | REVISION<br><small>Editorial use only</small> |
| 6. TYPE   | 7. CLASS | 8. SHIP <input type="checkbox"/> IN PORT <input type="checkbox"/> UNDER WAY |   |
| 9. DIVISION<br><b>EDUCATION</b>   |          | 10. BRANCH<br><b>ADVANCED TRAINING</b>                                      |   |
| 11. SECTION   |          | 12. UNIT  |   |
| 13. SUPERVISOR'S NAME<br><b>LOWDER, C. L. BTC</b>                         |          |   |   |
| 14. JOB TITLE OF SUPERVISOR<br><b>ASSISTANT TO EDUCATION OFFICER</b>      |          |   |   |
| B. JOB SUMMARY  |          |   |   |

Instructs retrainees in advanced visual communications through classroom instruction and actual demonstration on visual signal equipment and machinery. Repairs signal flags and operates motion picture projector.

C. DESCRIPTION OF DUTIES

I. Instructs class of retrainees in advanced course of visual communications.

A. Teaches basic principles of visual communications and the use of signal lights, semaphore flags, signal hoists and communication publications.

1. Assists students in learning Morse code and semaphore alphabet for operation of signal lamps and semaphore flags.

2. Teaches the flag hoists used and their individual meanings.

3. Instructs students in the use of a few navigation instruments such as standimeter, sextant and psychometer.

B. Lectures to class on principles of visual communications and of the curriculum of the course.





C. Reads from text, Signalman Third Class manual and demonstrates in classroom proper procedures to follow in naval communications. Requires students to practice exercises demonstrated.

D. Prepares progress report on each retrainee at graduation, or prior to clemency appearance, or at end of monthly period. (Enclosure A).

II. Operates visual training aids for classroom instruction in visual communications.

A. Operates 16mm motion picture projector in explaining details of visual communication equipment.

1. Rewinds film after showing and returns film to education office.

III. Operates sewing machine to repair and make new flags so as to complete flag bag.

IV. Supervises retrainees in cleanup of classroom and as collateral duties stands security watches in education building.

A. Acts as master-at-arms part time in education building.

B. Directs working parties on field day in clean-up details.

#### D. MACHINES, EQUIPMENT, MATERIALS AND TOOLS EMPLOYED

|  |  |
|--|--|
| 1. Machinery or Equipment with which incumbent must be familiar  | 3. Machinery or Equipment operated, serviced, installed or repaired  |
| Motion picture projector, sewing machine, Aldis multi-purpose signal lamp, Sextant, Standimeter, Psychometer | Motion picture projector, Aldis lamp, sewing machine.                |
| 2. Materials worked on   | 4. Tools, Devices or Publications used                               |
| Flags  | Training aids, Signal lights, Signalman Third Class training manual. |



Close supervision over 5-10 retrainees in class and 1 retrainee who cleans up classroom.

General supervision received from Assistant Education Officer.

Operating knowledge of the intricate equipment used in performing duties of signalman. Required to have rapid physical and mental coordination in carrying out of visual communication duties.

Personal motivation for duty at Naval Place of confinement. Ability to command attention and be able to maintain order in classroom by giving orders that will be obeyed.

None

High school graduate with courses in mathematics and science.

Instructor Training

College courses in astronomy and mathematics.

Extensive experience as first class or chief in charge of signal section aboard ship.

High school teacher with additional experience as summer camp instructor.

Recruit Training Instructor in Visual Communications.

Experience in Hydrographic office and instructor in high school mathematics or science.





GCT, MAT OR ELEC.

QMI or QMC

23-35

☒ MALE☐ FEMALE☐ EITHER

Promotion From: None

Promotion To: Senior Instructor

Communications company, Teaching.

Western Union operator, Bell Telephone Employee, Boy Scout

Instructor.

Western Union operator.

Scout-Master.

Camp Instructor.

Sextant: An instrument used to ascertain latitudes and longitudes by observing the altitude of the sun.

Stadimeter: A modified form of a sextant used for finding the distance of an object from its known height.

Psychometer: An instrument for measuring the aqueous vapor in the atmosphere consisting of two similar thermometers. The bulb of one is moistened.

This billet is primarily a navy job and therefore experience, recruitment and schooling must be almost wholly navy. Actual shipboard experience as a first class or chief quartermaster is the best background a person could possess so as to be qualified for the position of instructor.





DATE 22 March 1948

| VISUAL COMMUNICATIONS INSTRUCTOR |  | NPCM-111 |   |
|----------------------------------|--|----------|---|
| CLASS                            | REMARKS  | REMARKS  | REMARKS   |
| X                                | Classroom Instruction.                         |          |   |
| X                                | Demonstrates flag hoists                       | X        | Lifting movie projector books and other equip.                                |
|                                  |  |          |   |
|                                  |  | X        | Carrying textbooks and communications equip.                                  |
|                                  |  | X        | Walking around class-room giving demonstra-                                   |
|                                  |  | X        | tions   |
|                                  |  |          | Lecturing to class.   |
|                                  |  |          |   |
|                                  |  |          |   |
|                                  |  | X        | Putting up and taking down of flag hoists.                                    |
|                                  |  | X        |   |
|                                  |  | X        | Raising and lowering of flag hoists   |
|                                  |  | X        | in operation of sewing machine.   |
| X                                | Operates motion picture projector.             | X        | in work with all equipment.   |
|                                  |  |          |   |
|                                  |  |          |   |
|                                  |  | X        | Walking around in carry ing out duties of instructor.                         |
|                                  |  | X        | In answering messages sent by signal lamps and in answering ques- tions.      |
| X                                | Classroom instructor in visual communications. | X        | Perfect vision required for reading messages. sent by visual com- munication. |
|                                  |  | X        | Estimating distances of objects   |
|                                  |  | X        | required in reading color of flag hoists.                                     |
|                                  |  | X        | Reading flag hoists.  |
|                                  |  | X        | Hearing questions and orders.   |



## VISUAL COMMUNICATIONS INSTRUCTOR

ENLISTED NAVY JOB CLASSIFICATION CODE: 7442071LOCATION OF BILLET: Naval Re-Training Command, Education  
Department.QUALIFICATIONS

RATE: Quartermaster, First Class (QM1)

## TEST SCORE PATTERN

## NAVY BASIC TEST BATTERY

| <u>Test</u>            | <u>Cutting Score (NSS)</u> |
|------------------------|----------------------------|
| General Classification | 50                         |
| Arithmetic             | --                         |
| Mechanical             | --                         |
| Clerical Aptitude      | --                         |
| Radio                  | --                         |

## PHYSICAL DEMANDS

Age: Over 25.

Other: 20/20 vision required for reading visual messages; capacity for moderate (15-45 lbs.) lifting required; use of both hands and all fingers is necessary; ability to walk and stand for protracted periods of time; ability to distinguish basic colors and shades of color; capacity for depth perception to judge distances; normal hearing.

## PERSONAL CHARACTERISTICS

Ability for clear oral expression of thought; ability to command and retain attention of students; motivation





for duty at naval places of confinement. Incumbent must have clear civilian and Navy police record.

#### EDUCATION AND EXPERIENCE

##### Schools and Courses

Minimum: Navy instructor training course;  
two years high school.

Desirable: High school graduation.

##### Naval Background

Minimum: Moderate supervisory experience in various billets of rating afloat with some responsibility for instructing strikers.

Desirable: Moderate experience as recruit training instructor.

##### Civilian Background

Minimum: Moderate experience as leader in youth groups, particularly as Scout Master.

Desirable: Extensive experience in Merchant Marine or as seaman or mate aboard yacht.

#### BILLET SUMMARY

Prepares re-trainees for return to active service by insuring their training in visual communications.

#### DESCRIPTION OF DUTIES

1. Instructs class of re-trainees in visual communications.





Conducts classroom lecture on visual communications including semaphore flags, signal hoists and flashing light. Reviews use and content of communications publications. Operates blinker light to assist students in learning Morse code. Lectures on flag hoists and their meanings. Instructs class in use of navigation instruments such as sextant, stadimeter and psychometer. Operates 16 mm. motion picture projector to display training films on visual communications. Repairs flags and flag bags by operating sewing machine. Prepares and submits progress report on each re-trainee to Education Officer.

#### MACHINES, EQUIPMENT, TOOLS AND MATERIALS

Operates 16 mm. motion picture projector, sewing machine and aldis lamp. Uses sextant, stadimeter and psychometer. Refers to Quartermaster, Third Class, training manual.

#### WORKING CONDITIONS

Inside classroom 80% of time. Remainder spent outside in demonstrating visual signalling.

#### NAVAL BILLET RELATIONSHIPS

None

#### PROCUREMENT SOURCES

PRIMARY: Merchant Marine, yacht clubs.

JOBS: Able seaman; mate.



CIVIL READJUSTMENT INFORMATION

This billet provides qualifying background for the following positions in: U.S. Federal Civil Service

- |                                  |            |
|----------------------------------|------------|
| 1. Communications Coding Series  | CAF-1610-0 |
| 2. Cryptographic Clerical Series | CAF-1630-0 |
| 3. Radio Operating Series        | CAF-1670-0 |

Public and private agencies and industries (Titles and codes from Dictionary of Occupational Titles, Department of Labor).

- |                       |         |
|-----------------------|---------|
| 1. Cryptographer II   | 1-35.30 |
| 2. Radio Operator     | 0-61.30 |
| 3. Telegraph Operator | 1-41.12 |

\* \* \*

The preceeding examples of questionnaire, job analysis schedule, physical requirements form, and billet specification clearly show the great amount of detailed work involved, and the mass of information that is obtained when the work is done properly.

Difficulties and Shortcomings

No substantial technical difficulties have been encountered in making analyses on shore stations. Some difficulty has been encountered on board ship, particularly when the nature of the ship's operations required personnel to be at Condition I, Condition 1E, or Condition 2. At such times, all personnel on board or a considerable number of them are stationed at predetermined areas known as "battle stations",





'abandon ship stations', and so forth, in anticipation of battle or some impending emergency. At such times, either under conditions of readiness for actual battle or under simulated conditions for battle training, job incumbents have not been available for interview and this results in some delay in completing surveys. However, beyond the time lost on the part of the analyst (which can usually be taken up in writing up job schedules), no substantial technical difficulties have been encountered.

Actually, no shortcomings have been found in the job analysis program, inasmuch as the program was tailored to the needs of the Navy, and the format adopted was designed to supply job description data to any segments of the Navy concerned with personnel administration. Perhaps it might be considered a shortcoming that the analysis cannot be made very rapidly; consequently, many types of jobs still have not been studied. However, if the quality or quantity of material included in the job analyses were reduced, then all segments of the Navy would not be served by the studies being made. The current methodology appears to be most practical for present needs. If there were more analysts, a much faster and more thorough job could be done.

A complete "on location" analysis of all naval officer and enlisted jobs including projected mobilization billets has not been completed to date. However, job definitions of classes of jobs throughout the entire naval establishment,





by means of mail survey interrogation of controlling bureaus and offices, have been developed to supplement the large segment of on location surveys that have been completed since 1943.

#### Keeping Data Current

The Navy has more than one thousand discrete enlisted jobs and more than one thousand officer jobs. In addition, jobs may differ from one type of naval establishment to another due to organizational differences, climatic conditions, war plans of an activity, or the basic mission of the activity. As a result, it is necessary to either conduct original analyses at each type of naval establishment or, as a minimum, validate the material that is already gathered.

For complete analysis of each discrete naval job, it is anticipated that, with the present staff, the work will take at least ten years. Actually, the task will never be completed because new jobs and organizational changes are constantly occurring. Improvements in procedures and techniques are being made slowly but continually from time to time as new problems arise and as careful research warrants these changes. It is anticipated that further modifications will be made gradually as changing situations or new needs for material may develop.

The method of keeping job analysis current is by means of a mechanical control plus a continual review of new organizations being established and new programs being initiated.





The mechanical control is found in the Personnel Accounting System which currently flags the Analysis Branch by means of a definite code punched into the personnel accounting cards when a new classification, for which there is no current job definition, is found at any naval activity. This is reported through the personnel classification and personnel accounting systems. In addition, the administrators of the division and interested technicians review semi-monthly directives of the Navy Department and of the National Military Establishment and other appropriate program directives setting up new organizations and establishing programs for the effective maintenance and use of new weapons and the necessary logistics support.

A general survey is made of an entire unit or of several additional identical type units at the beginning, in the initial analysis of the organization. Resurveys are made whenever major organizational or functional changes occur in that type unit. For example, a survey was made of naval shipyards at Bremerton, Mare Island, New York, and Portsmouth, New Hampshire, in 1943. Upon completion of the specification writing in these yards, the completed manuscripts of specifications were validated in those yards and in the yards at Boston, Philadelphia, Norfolk, Charleston, and Pearl Harbor prior to publication of the specifications. The first major revision of the shipyards after that date came as a result of a general order in October, 1945. Subsequent to the promulgation of that order, an additional job analysis was made





of a typical shipyard to bring the job specifications into alignment with the new organization structure. This was further reviewed by management personnel at the cognizant bureau prior to publication.

Thus, the job analysis program is a continuing function. Generally, there are three main areas in which job analysis is being conducted. They are: (1) naval billets aboard ship, (2) at shore units, and (3) "speciality" billets. The study of naval billets aboard ship and at shore units has already been discussed. Analysis of speciality billets are conducted as the need arises. During the past year the Analysis Branch completed studies of billets in the Navy's radiological safety program and billets at separation centers. Current plans call for job analyses to be made in connection with the Navy's guided missiles organization and Arctic warfare program.

#### Job Analysts

A total of approximately seventy-five analysts in the bureau and an additional number in the field is required to make a current job analysis system for the Navy. The seventy-five analysts rotating between the bureau and the field are required to keep job analysis current and to maintain in a current condition personnel management publications.

Three types of personnel are used as job analysts:

(1) Civilians who must meet the civil service requirements for military occupational analysts. The requirements include





experience in job analysis and in formulating job specifications. (2) Reserve officers recalled to active duty. These officers have a background in personnel administration. (3) Enlisted personnel of the Personnel Men rating who have had training in job analysis.

Enlisted naval job analysts are trained in a formal course at the Personnel Men's School, U.S. Naval Training Station, San Diego, California, as an integral part of their course in classification. Officers on active duty or civilian technicians at the Bureau of Naval Personnel as job analysts are trained at the Bureau in small groups subsequent to their selection. The principal publication for both of these courses is the same, "Manual of Instructions for Naval Occupational Analysis",<sup>1</sup> prepared by the Analysis Branch. This course includes discussions on the place of job analysis in the field of personnel administration, techniques employed in 'on-location' surveys, use of the naval job analysis schedule, principles of interviewing, instructions for group supervisors, directions for completion of physical demands data, and training in schedule writing.

The Navy considers that classroom training of approximately forty hours qualifies a person for apprentice level work in conducting job analyses. However, in order to qualify as a journeyman job analyst, considerable additional on-the-job training and review is usually required to be

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<sup>1</sup>Ibid.





given to each analyst by the group supervisors in the field. The time element in each case varies with the man. Several men who have the qualification to become reasonably good analysts and possessing the same basic aptitudes may enjoy these aptitudes in varying degrees. Very few analysts are qualified to work independently as journeymen, however, until they have participated in two surveys in the field under direction, each having a duration of approximately sixty days. Between these two field surveys there usually is a period of three or four months learning the specification writing procedures and techniques in the Bureau. This provides an almost certain minimum for an analyst to be able to conduct a field survey independently or as a leader of a small group. Additional time in the writing of specifications is required before a man can become a journeyman specification writer capable of working with only very limited review. Experience has proven almost conclusively that the average job analyst, to provide survey material comprehensive for all personnel administrative needs, continues to "grow" and improve his technique for a period of about two years.

#### Uses of Job Analysis

The use of job analysis in the Navy may be visualized as a wheel with job analysis as the hub. The various functions of personnel administration, namely; (1) recruitment, (2) selection, (3) training, (4) detailing, (5) transfer,





(6) promotion, (7) classification, (8) separation, (9) welfare, (10) pay evaluation, (11) complements, (12) performance, (13) records, (14) civil readjustment, (15) war plans, and (16) peace plans are the spokes of the wheel. The rim of the wheel is efficient personnel administration which is equal to effective manpower utilization.

The objective of analyzing jobs in the Navy is to provide detailed information in a standardized form to serve as a basis for personnel administration publications and materials. The specification is the principal product presenting this data. From the specifications are developed (1) a coding structure for job identification for use in personnel accounting and classification, (2) a modern rating structure, (3) qualification standards for advancement or promotion, and (4) such additional publication and technical devices as may be required from time to time to help the Navy to most effectively utilize its total manpower.<sup>1</sup>

The many uses of job analysis in the Navy can best be illustrated by listing the titles of projects completed or started by the Billet and Qualifications Research Branch during the fiscal year 1948.<sup>2</sup> Of the items which follow, 1 to 13 inclusive were completed during the fiscal year 1948,

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<sup>1</sup>Ibid., p. 5.

<sup>2</sup>U.S. Navy Department, Bureau of Naval Personnel. Bibliography of Accomplishments of Billet and Qualifications Research Branch, Research Division, Fiscal Year 1948, July 1948, (Unpublished), pp. 1-5.





items 14 to 27 inclusive started in fiscal year 1948 and were carried over into fiscal year 1949.

1. Catalog of Recruit Training Command Billets, (NavPers 18,147).
2. Billets Requiring Postgraduate Training or Special Qualifications.
3. Study of Ratings for which WAVES may qualify.
4. Ratings for which Isolated Volunteer Reservists may qualify.
5. Enlisted Precedence List.
6. Armed Forces Pay Analysis.
7. Extra Compensation for Special Details.
8. Manual of Enlisted Navy Job Classifications (NavPers 15,105); Maintenance of.
9. Naval Job Physical Requirements.
10. Reserve Officer Procurement Qualifications.
11. Establishment of Titles, Classifications and Technical Fields for limited duty officers (LDO's)
12. Armed Forces Enlisted Occupational Specialties and Comparable Civilian Occupations.
13. Qualifications Standards for Naval Officer Promotion.
14. Manual of Officer Navy Job Classifications.
15. Qualifications Standards for Mobilization of Reserve Officer Specialists.
16. Catalog of Naval Shipyard Billets (NavPers 15113).
17. Mobilization Billets for WAVE Reserve Officer Specialists.
18. Guided Missile Personnel Survey.
19. Catalog of Officer and Enlisted Billets in Naval Places of Confinement.
20. Catalog of Ground Controlled Approach Billets.
21. Manual of Qualifications for Advancement in Rating (1947 Edition) (NavPers 18068).
22. Qualifications Standards for New Warrent Officer Classifications.
23. Billet Requirements, Qualifications for Advancement in Rating, and Career Area of Exclusive Emergency Service Ratings.
24. Manual of Enlisted Navy Job Classification (NavPers 15105); Revision of.
25. Profiling of Armed Forces Jobs.
26. Rating Monographs for Recruitment of Enlisted Personnel.
27. Manual of Instructions for Naval Occupational Research Analysts.





The foregoing list of accomplishments of the Billet Analysis Branch clearly indicates a part of the detailed mass of information that is available in the Navy and on which objective personnel action is based.

The most useful material obtained in job analysis studies has been the development of the naval job specifications system, providing a complete encyclopedia about each naval officer and enlisted job as it is surveyed. These specifications have been the most valuable since they have provided an almost complete source of information for other publications, devices, and instruments required for the solution of the specific personnel problems for the administration of personnel operations.

Job analysis made possible the development of standard job terminology and development of a comprehensive job codification identification system for machine record personnel accounting purposes.

Job analysis surveys have been instrumental in effecting the following types of change: (a) reorganization of naval activities and reallocation of functions including the abolition of certain jobs and the creation of new billets providing more homogenous work assignments and a more logical work flow; (b) the reorganization of the Navy's occupational groupings for positions roughly equivalent to foremen and below (chief petty officers to recruit seamen). This realignment of occupational groupings is called, technically, a new





rating structure' and realigns naval occupational groups among enlisted personnel along functional lines, eliminating obsolete ratings and providing career ladders for each enlisted man in the Navy, from the level of unskilled labor (seaman recruit) through to junior executive (warrant officer and commissioned officer).

Naval job analysis has also indicated that in some instances personnel can be over-trained for the level of work to which they are assigned, resulting in a time loss on the part of the Navy; in addition, has indicated possibilities of times when training has been misdirected. The Training Research Branch of the Bureau of Naval Personnel uses analyses to improve training in all branches of the Navy.

Job analysis has been used to determine the qualifications required for personnel who are to be procured and assigned. They are especially useful in procuring and assigning reserve enlisted and officer specialists. The Navy has recently prepared a manual, United States Navy Occupational Handbook<sup>1</sup> for use by civilian guidance counselors in acquainting high school students with the occupational opportunities in the Navy. Job analysis was the source of considerable information contained in this publication.

As a result of the job analysis studies made over a wide area, plans have been made, commencing fiscal year 1950,

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<sup>1</sup>U.S. Navy Department, Bureau of Naval Personnel, United States Navy Occupational Handbook, Washington, D.C., 1948.





to set ship and station allowances by naval job classification code (numerical identification) in addition to rating (Occupational group). Currently and heretofore, allowances have been set by occupational group only (by ratings). This new method, made possible by naval job analysis, assures for closer and more positive fiscal control in the allocation of personnel funds and in the preparation of future budgets.

Because of the high correlation between age and rank and the rigid physical requirements in the naval establishment, the obtaining of physical requirements information has, until the present time, been of little practical value in the administration of naval personnel. However, because of the possibility of a large drain on the nation's manpower in the event of future war, it is felt advisable to determine billets where officers and enlisted personnel who would be expected to be less active physically, because of greater age or other physical incapacity, could be utilized. Since the primary business of the Navy is national defense and the purpose for its being is war, then:

In event of national mobilization, the occupational information developed on the basis of job analyses and other research would be used not only for internal Navy manpower planning and allocation but, in addition, for coordinating Navy manpower emergency requirements with those of other branches of the National Military Establishment and with industrial emergency requirements as determined by the National Security Resources Board and other civilian manpower agencies.<sup>1</sup>

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<sup>1</sup>Manual of Instructions for Naval Occupational Analysis, op. cit., p. 5.





Lastly there is definite use for job analysis for civil readjustment purposes. At the end of World War II when large numbers of men and women were discharged from the armed services, it became apparent that they needed advice in selecting post-war vocations. Programs were developed for giving such advice, but the published information regarding naval specialties and comparable civilian occupations and the interchangeability of such jobs was meager. As the volume of discharges increased the advising was often hurriedly done or omitted entirely. In the event of another war the same conditions may prevail unless an adequate body of knowledge is collected for future use. But this need exists not only at the end of a war, but even in peacetime. For the Navy also owes a responsibility to the individual who has completed his term of service by providing that individual with information which will enable him to assume a civilian occupation commensurate with his abilities and experience and to become a useful and loyal citizen in a civilian community.

#### Job Analysis in the Army<sup>1</sup>

In 1940, the Army decided that information was necessary about the jobs being performed by the military personnel. At the request of the Army the United States Employment Service

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<sup>1</sup>Except where otherwise indicated this section is based on replies to questionnaire received from Mr. D. S. Trabue, Chief of Occupational Analysis Unit, Manpower Analysis Section, Personnel Research and Procedures Branch, AGO, Washington, D.C.





spent several months making job analysis of military jobs. No further work was done until after the start of the war, when in 1942, it was found that the information available was inadequate for mobilization, placement, training, and other personnel functions. The previous studies had been found insufficient, chiefly because they were based on a peacetime army. To remedy this lack of information, job analysis studies were undertaken, but only to the extent that was required for immediate needs, without any long range program in view. It was not until 1946, that job analysis was undertaken on a major scale.

The method used in making the job analysis consists of observation and interview of job incumbents by a trained job analyst; recording of job titles, duties, tasks, work steps, skills, knowledges, special abilities, working conditions, hazards, supervision, physical demands, and relationship to other jobs; verification of information with supervisors; and repetition of process for the same job in a variety of other units, with average of four days per job schedule.

The teams utilized in the surveys represent every arm of the service and consist of officers, the top three grades of enlisted men, and civilians. The teams are usually in charge of a military chief in charge who performs the administrative duties and supervises the military and civilian personnel. There is also a civilian technical chief under whose direction the civilians work. A third man, a civilian





technician, acts as editor of the group, reviews all job analysis schedules, and trains the analysts. When a study is completed on one station, the schedules are forwarded to a central office. Similar schedules are prepared on another station for the same jobs; all are compared and a composite schedule is prepared for each job.

The same basic techniques are used for analysis of all enlisted and warrant officer jobs. Up to the present time no actual analysis has been made of officer jobs, but a program is presently under study and may be undertaken in the near future. However, a classification of officer jobs has been prepared on the basis of information obtained by questionnaire or interviews, and compiled from current army publications.<sup>1</sup>

The difficulties and shortcomings of job analysis in the army consist of: (1) untrained job analysts; (2) unsatisfactory job analysts; (3) alteration of job content as a result of unusually high qualifications of the incumbent; (5) preparing objective statements to describe the specific skills, knowledges, and mental and physical abilities required to perform each task of a job; (6) economic impossibility of analyzing rare jobs in isolated places; and (7) attempt by field analysts to rate the job, on the spot, on a variety

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<sup>1</sup>U.S. War Department, Officer Classification, Commissioned and Warrant, TM 12 - 406, U.S. Government Printing Office, Washington, D.C., 1946, p. 6.



of factors in a point evaluation system, later comparison of the same job in other units, on an army-wide comparative basis, frequently produces different results.

During the war approximately two hundred military and civilian analysts were used, with as many as 130 in the field at one time. At the present time a permanent staff of thirty analysts are employed. The civilian analysts are personnel technicians who were hired as job analysis experts. The military analysts are trained in the army. The course of instruction consists of one month intensified formal training, followed by one month of practice exercises in job analysis, and followed by three months of field analysis under close supervision and continuous guidance.

Job analysis information has been used for the following purposes:

- (1) Development of new classification and assignment system.
- (2) Development of career fields, occupational families.
- (3) Identification of new job training course.
- (4) Review of adequacy of each job training course.
- (5) Development of new job code system.
- (6) Identification of physical demands of jobs under varying situations.
- (7) Development of job evaluation devices.
- (8) Guiding preparation of job proficiency examinations.





- (9) Improved measurement of standards of performance.
- (10) Improved manning tables for units.
- (11) Isolation of jobs for females and physically handicapped.
- (12) Redefinition of scope and tasks of many jobs.
- (13) Preparation of revised manning tables for units.
- (14) Consolidation of many jobs; deletion of many others.

All jobs are classified into charted occupational career fields which show lines of progression, job sources, opportunities for advancement, logical lateral transfers, and planned career possibilities from lowest enlisted grades to warrant officer. In planned career development, significant changes in job content indicate need for training in order to advance to next higher job.

Continuous analysis of separate organizational problems has resulted in noticeable revision of many manning tables. Standards of authorization are developed for all jobs in number and grade for all units, based on work flow, responsibility, performance requirements, and requirements of the job.

#### Job Analysis in the Air Force<sup>1</sup>

Prior to the establishment of the Air Force as a separate military branch by the Armed Services Unification Act

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<sup>1</sup>Except where otherwise indicated this section is based on replies to questionnaire received from Major Gardiner S. Gibson, USAF, Chief, Classification and Analysis Branch Headquarters, USAF, Washington, D.C.





of July 26, 1947, the army system of job analysis was used for the study of Air Force jobs. The surveys that were then carried on resulted in the publication of a classification manual which is still in use.<sup>1</sup> With the severance of the Air Force from the Army, many reorganizational problems delayed formulation and adoption of a job analysis program until June, 1948. This program consists primarily of gathering data by questionnaire and interview. The questionnaires employed are of two types, one for officers, the other for enlisted personnel. The officers' questionnaire is a combination of a narrative form and check list, consisting of twenty pages. On the basis of data obtained for the same job from many different questionnaires, a job description specification is prepared. The format of the job specification consists of the following seven major parts:

0. Air Force Specialty Code and Job Title.
1. Job Summary.
2. Job Description.
3. Job Requirements.
4. Job Progression.
5. Job Rating.

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<sup>1</sup>U.S. War Department, Headquarters Army Air Force, Military Personnel Classification and Duty Assignment, AAF Manual 35-0-1, April 1944, Revised through 1 July, 1945, Washington, D.C.



## 6. Related Occupations.<sup>1</sup>

The career Development and Classification Division has only ten persons assigned of which six are technical analyst experts who interpret data from questionnaires and prepare job specifications. There is no formal training of analysts, except on-the-job training.

The reported uses of job information are:

- (1) Primarily in the preparation of job specifications.
- (2) Precision of description ensures maximum utilization of manpower.
- (3) Reveals areas where training is needed and the kind required--thus furnishing a comparison between what is and what should be.
- (4) Serves as a basis for a career system.
- (5) Reflects requirements by skills for occupational areas for recruitment requirements and for placement effectiveness.
- (6) Permits accurate definition what a job really is, as against individual interpretation of what a job is thought to be.

### Job Analysis in the Marine Corps

A classification system had been in effect in the Marine Corps for many years although it was not known by that name.

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<sup>1</sup>U.S. Air Force, Career Development and Classification Division, The Preparation of Air Force Job Specifications, February, 1949, Washington, D.C., p. 3.





At the beginning of World War II, like the other branches of the Armed Services, the Marine Corps found that the information regarding its various jobs was inadequate for recruitment, placement, selection, and other personnel functions. Consequently a study of jobs was undertaken and a classification manual<sup>1</sup> was completed in 1945. This Classification consisted primarily of writing job descriptions, without detailed job analysis but on the basis of what the jobs were thought to be. Each job description was given a code number, and a marine was given a similar code number when he met the qualifications as specified in the job description.

Job analysis was conducted only locally to meet some specific need, but no overall program was established until 1947. This program covers all military jobs except those filled by generals and colonels. The technique employed for getting job information is by interview of those individuals who supervise the job, and interviewing and observing the job incumbent. The data obtained is recorded and reported in a Job Analysis Schedule, which resembles the format of the Naval Billet Specification. The Job Analysis Schedule is made up of nineteen items as follows:

1. Job title
2. Date

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<sup>1</sup>U.S. Marine Corps, Manual of Military Occupational Specialties, (NAVMC 1008-PO), Classification Division, Detail Branch Personnel Department, Headquarters Marine Corps, Government Printing Office, Washington, 1945.





3. Alternate titles
4. NAVMC 1008-PD Title
5. Speciality Specification Number
6. Organization
7. Table of Organization letter and number
8. Number employed and rank
9. Hours spent
10. Analyst
11. Reviewer
12. Work performed
13. Unusual Physical Qualifications
14. Skills and Knowledges Required
15. Relation to other jobs
  - a. Jobs providing a background of skills for this job
  - b. Jobs for which this one provides a background of skills
  - c. Supervision received
  - d. Supervision given
16. Weapons, Equipment, and Materials Employed
17. Weapons, Equipment, and Materials Serviced and Repaired.
18. Definitions of terms and equipment
19. Remarks<sup>1</sup>

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<sup>1</sup>U.S. Marine Corps, Job Analysis Manual, Classification Division, Detail Branch, Personnel Department, Headquarters U.S. Marine Corps, Washington, D.C., pp. 7-14.



The method employed for making the analysis, that of interview and observation of a job incumbent by an analyst, is one of the most satisfactory methods. However, the chief shortcoming in making the analysis was the use of amateur analysts who were local personnel and who had received only two weeks' training prior to beginning the analysis. The original analysis has just been completed, but a classification based on this study has not yet been placed in effect.

The data on job information was compiled by approximately one hundred job analysts, some of whom worked only a short time. The length of time required to gather the information on twelve hundred distinct and separate jobs was about six months, and an additional twelve months were required for preparation of a manual of jobs based on the analysis.<sup>1</sup>

According to the Marine Corps Job Analysis Manual,<sup>2</sup> the data obtained will serve as the basis material used for planning, training, procedure developing, research, and operating functions. The following are specific examples of how the data will be utilized:

(1) Identification of the various jobs which currently exist in the Marine Corps, determination of the proper job specifications for each, determination of job interrelationships and job progression ladders, development of a revised and meaningful codification system for Marine Corps jobs, and the

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<sup>1</sup>Answer to questionnaire by H. L. Uphoff, Chief, Personnel Research Division, U.S. Marine Corps, Washington, D.C.

<sup>2</sup>Op. cit., p. 1.





subsequent revision and maintenance of the Manual of Military Occupational Specialties (NAVMC 1000-10 (Revised)).

(2) Providing accurate information regarding the duties of a specific job and the knowledges, abilities, and skills required for the performance of such duties, in order that training programs may be developed which will produce graduates fully qualified to fill the job.

(3) Providing means of presenting a clear picture of the manpower needs of a particular unit so that Tables of Organization may be prepared with the greatest accuracy.

(4) Development of aptitude and trade tests for measuring the abilities of and selecting individuals for particular types of training and duty assignments.

(5) Developing military job proficiency tests for classification and promotional purposes.<sup>1</sup>

### Summary

While job analysis studies in industry and in the Public Service have been in existence for approximately forty years, job analysis studies in the Armed Forces can be considered a byproduct of World War II. While the army began a study in 1940, it was only minor in nature and scope. After Pearl Harbor the necessity for mobilizing, training, and placing vast numbers of individuals into jobs for which they were best suited, soon revealed that there was a complete lack of job information for effective manpower utilization. All of the services have carried on numerous job studies and have catalogued the occupational information in various publications. Of the programs now extant the Navy is pursuing the most extensive program of study. The Army program is

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<sup>1</sup>Ibid., pp. 1-2.





conducted on a current basis. The programs of the Air Force and the Marine Corps, are less extensive and still in a stage of experimentation and evolution.

However, the Armed Forces have recognized the need for accurate occupational information and are attempting to obtain comprehensive descriptions of all peacetime and wartime jobs, and their relationship to civilian occupations, so that in the event of another war maximum utilization of the nation's manpower resources will be realized.



## CHAPTER V

### JOB ANALYSIS IN THE COAST GUARD

#### Introduction

As stated in the introductory chapter, the problem of this study is to examine the recommended practices of industry, the public service, and the Armed Forces in making job analyses; and further to determine which practices could be utilized by the United States Coast Guard. The first part of the problem has been considered in Chapters II, III and IV. It remains to be seen which of the described practices would be applicable for use in the Coast Guard. The application of the data to the Coast Guard is based primarily on the experience of the writer within that service, and no attempt is made to verify or validate by actual test the program proposed in this chapter. Further, no claim is made that this is the right program or the only program feasible, since this can only be substantiated or disproved by actual practice within the service. Consequently, this chapter is a proposed suggestion for a program based on individual study, without regard or consideration of any official action pending or being contemplated.

In formulating a program the following points will be discussed: (1) Should job analysis be undertaken in the





Coast Guard, (2) what information is now available, (3) what jobs are to be analyzed, (4) who will analyze the jobs; and (5) establishing procedures and techniques for a job analysis program.

#### Should Job Analysis be Undertaken

The first question that must be decided is whether a job analysis program should be undertaken in the Coast Guard. On the basis of the practices in industry, the public service, and the other branches of the Armed Services, all of which report certain benefits that have accrued to individual organizations, the answer appears to be affirmative. It appears logical that industry, the public service, and the Armed Forces would not undertake and continue a program of occupational research unless they could derive benefits that would more than compensate for the expense, time, and labor involved. From this deduction it would be a natural conclusion that if other organizations enjoyed certain benefits from a program of job analysis, the Coast Guard would also profit by the adoption of the program. However, job analysis in itself is not an end result and does not solve any problems but is only one of the tools available in personnel administration for attaining an end result. Any benefits that an organization realizes result from the practical application of job information to a specific need. Organizations that have undertaken job analysis programs first recognized some





specific need and adapted the program to fit their own requirements. So unless there is a specific need for occupational information in the Coast Guard, there is no justifiable reason for undertaking a job analysis program.

Thus the decision whether a program of job analysis should be undertaken by the Coast Guard must be based solely on the requirements of the service. This decision must be made by the highest authority within the service with a full realization that once such a program is formulated and adopted, it will serve as a basis for personnel action for years to come. To secure acceptance and active support of the program the purpose must be clearly formulated and promulgated to personnel at all levels in order that their full cooperation may be secured. In the final analysis, the effectiveness of the program can only be measured by the willingness of the Coast Guard to accept the facts as determined and to base personnel action on such facts.

The specific personnel needs that would justify the installation of a job analysis program can only be determined by a critical and unbiased evaluation of the present personnel practices, and a recognition of the shortcomings or inadequacy of such practices wherever they exist. The specific needs on which the decision to install a job analysis program must be based are directly related to the uses to which job analysis could be put, and the value of such program to the Coast Guard. Consequently, the purpose of the program must





be fitted to the specific uses that it is desired to make of the information. The possible uses for job information data in the service are:

(1) Will provide an accurate description of what a job really is, as opposed to individual interpretation of what a job is thought to be. Writing job descriptions will furnish an encyclopedia of information about each job, so that the jobs can be distinguished from each other. It is true that officers, through their training and experience in the service, collect much general information about the various jobs in the service, and think they know what the jobs consist of. But were they, however, to try to record this information, they might find it neither so definite nor so ample as they believe it to be. If anyone thinks that he is fully cognizant of what all the jobs in the service consist of, let him try to write complete description of all the jobs on his own station or vessel.

(2) Writing job descriptions will give factual information on which to determine the varying personnel requirements for comparable administrative units. The number of personnel required at any unit is dependent on the workload at that unit. A study of the jobs as they actually exist will permit a more realistic determination of the complements required at two comparable units.

(3) The object of personnel administration is the most effective utilization of personnel. This involves the





recruitment and placement of personnel into positions for which they are best fitted. Scientific personnel management recognizes the factor of individual differences; that is, that individuals possess knowledge, ability, interests, and skills to varying degrees. The tradition that has been prevalent in the Coast Guard is that all-around personnel should be trained that are capable of filling any number of different jobs. The willingness to tackle any job and to carry through to completion is a sign of high morale and loyalty but whether the performance is the best possible under all conditions is questionable. Only by the study of the jobs within the service and a determination of the minimum requirements of each job, can the capacities of individuals be fitted to jobs for which they are best suited, and maximum performance be secured. Moreover, whenever a man is assigned to a job that can be filled by a man with a lower rating there is a waste of manpower.

(4) Jobs are not static but are continually changing. This change is caused by technological advances, administrative reorganization, addition of duties, and deletion of other duties. The jobs in the service today are not the same as were in existence twenty or even ten years ago. Unless accurate current job information is maintained, erroneous ideas of what the jobs are will continue to persist, and complements and allowances will often be based on requirements of past years instead of current needs.





(5) Job analysis should serve as a basis for personnel budget requirements. Accurate description of the jobs as they exist in the Coast Guard will eliminate the uncertainty of the number of personnel required for various functions, and will serve as a basis for justifying personnel needs.

(6) Job analysis can be used for obtaining information for organizational purposes. Some of the problems that are constantly occurring are: (a) necessity for reorganization of certain activities, (b) reallocation of certain functions, (c) deletion of duties, and (d) creation of new billets to provide more homogenous work assignments and a more logical work flow. The solution of these problems requires that accurate information be available on which to base action.

(7) The training of personnel must be directed to the specific requirements of the various jobs. Training within the service is primarily vocational training designed to qualify personnel for the performance of certain duties within the service. Thus, recruit training is used to train the newly inducted man what is expected of him and how to get along in the service; advanced enlisted training is for the purpose of qualifying a man in some particular specialty that he requires within the service. Even the Coast Guard Academy is primarily a vocational school where cadets are trained to be officers in the service. But is the training being offered the best for each purpose for which intended, and are changes in curriculum keeping up with the changes that



are taking place in the service? Only by a study of the actual jobs can the training be kept current and be adapted to the requirements of the service.

Other uses for job analysis within the Coast Guard that will be mentioned briefly are:

- (1) Permit establishment of a classification system for all personnel.
- (2) Requirements for promotion of personnel would be clarified and could be standardized.
- (3) Examinations and tests of personnel for promotion could be based on accurate data of what their next job will be.
- (4) Reveal unsatisfactory work conditions, or conditions that may cause accidents.
- (5) Reveal faulty work procedures and duplication of effort.
- (6) Permit more accurate evaluation of personnel merit.
- (7) Serve as a basis for a coding structure for personnel accounting.
- (8) Provide information for civil readjustment of personnel being separated from the service.

If a determination of the personnel needs of the Coast Guard indicates that any or all of the uses of job analysis enumerated above would be beneficial to the service, then justifiable reasons exist for the adoption of such a program. It is the opinion of the writer that a critical examination





of the personnel practices of the Coast Guard would reveal not only a need to which the above uses could be put but also many others, and that definite and material advantages would accrue to the Coast Guard by the adoption of a job analysis program.

#### Information Available

Although the Coast Guard has no overall program of job analysis, considerable occupational material is available. It is necessary to examine such information to determine whether any additional information is required. This information consists of:

- (1) Service regulations and directives specifying the duties of certain positions.
- (2) Organizational charts.
- (3) Requirements for advancements in ratings.<sup>1</sup>
- (4) Position descriptions of all civilian positions.
- (5) Position description of military billets that were formerly civilian positions, such as the Lighthouse Service and Marine Inspection positions.
- (6) Job descriptions and specifications prepared by

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<sup>1</sup>U.S. Coast Guard, Personnel Bulletin 76-44, Ratings, Abbreviations, Precedence, and Qualifications, Washington, D.C., 1944, pp. 9-72. Personnel Bulletin 76-44 is to be replaced by Chapter 6 of the Personnel Manual, which is now being printed by the U.S. Government Printing Office.





the Navy, for which comparable positions exist in the Coast Guard.<sup>1</sup>

The service regulations, directives and organization charts specify the overall policy governing certain positions and do not include the details of the job or the minimum requirements for such positions. Moreover, with changes in duties and technological advances the general directives are often not revised with each and every change that may affect a particular job.

The requirements for advancements in ratings specify the minimum qualifications that an enlisted man must possess before he can be considered qualified for advancement. However, such qualifications are based on what the jobs are thought to be and not on what they actually are as determined by factual study.

The civilian position descriptions contain only partial information about such jobs. Further study is required to show relationship to the organization.

The position descriptions of former civilian positions may contain a certain amount of valuable information, especially with respect to Marine Inspection positions which have not

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<sup>1</sup>U.S. Navy Department, Bureau of Naval Personnel, Study of Interchangeability of Jobs Performed by Enlisted Personnel in the Navy, Army, Marine Corps, and Coast Guard, April, 1947 (Restricted) Washington, D.C.

and  
U.S. Navy Department, Bureau of Naval Personnel, Armed Forces Enlisted Occupational Specialties and Comparable Civilian Occupations, August, 1947 (Restricted) Washington, D.C.





changed materially even though many billets are filled by personnel with military status. However, on the whole it will probably be found that the information is incomplete and additional information will be required to obtain a clear picture of former civilian jobs.

One of the most valuable sources of information consists of Navy descriptions and specifications. It is believed that some of the information developed by the Navy could be applied intact to the Coast Guard. However, before any such information is used, it should be first validated to ensure that it applies to the Coast Guard.

On the whole considerable occupational data are available, but the information is not systematically collected, recorded, or catalogued. Even if it were catalogued for use, such data could not be accepted without validation against the jobs as they actually exist in the service today, for any action contemplated may be based on information of a misleading nature. Thus, only through job analysis can reliable and factual information be obtained.

#### What Jobs are to be Analyzed

Having made the primary decision that a job analysis program is required in the Coast Guard, the next question to be decided concerns what jobs should be analyzed. The answer to this question will naturally depend on the particular purpose for which job information is required. Studies





can be undertaken of different groups--they can consist of analyses of officer billets, enlisted billets, or civilian positions only, or any combination of the three groups. Further, the studies can be undertaken on an organizational or functional basis or both.

In analyzing the jobs in the Coast Guard, the service as a whole should be considered. The study of a particular group will give only partial information. Only by analyzing all of the billets in the service, both military and civilian, and their relationship to each other, will an accurate picture of the entire organization be obtained. Since all jobs cannot be studied at one and the same time it will be necessary to separate the personnel into certain groups for purposes of study. The least amount of difficulty will probably be experienced in first studying military jobs on an organizational basis by units. Study of billets aboard vessels, or at lifeboat stations, light stations, or other operational units can be undertaken first for this purpose. The study of administrative units, district offices, and Headquarters should follow.

The analysis of civilian positions in the service is one requiring special considerations. Such positions are now classified and position descriptions are available for each position in accordance with the requirements of the Department of the Treasury and the Civil Service Commission. However, the descriptions of civilian positions are individual





descriptions of the tasks performed by a particular individual. Such descriptions contain the WHAT and HOW of a job but not the WHY. In other words, no overall relationship is established between one civilian position and other civilian positions, nor between the civilian positions and military billets or the organization as a whole. It is not intended that an analysis of civilian positions should have as its primary purpose the elimination of any positions, any more than the analysis of military billets, but such positions should be clearly related to the entire organization. Thus, in the study of a district office, the completed study would eventually show definite billets to be filled by commissioned officers, others by warrant officers, many billets by enlisted personnel of various ratings, and certain positions by civilian personnel. Only by a consideration of the workload and duties of all positions can the total complement be determined. A study of civilian positions cannot be undertaken by the service independently but would have to be done with the cooperation and in accordance with the general policy formulated by the Department of the Treasury and in accordance with the requirements of the Civil Service Commission.

#### Who Will Analyze Jobs

The next decision to be made is who will analyze the jobs in the Coast Guard. Since there is no job analysis expert in the Coast Guard it seems that the problem of a





staff should be divided into three separate steps. The first is securing the advice and counsel of job analysis experts to advise on the setting up of a job analysis program. This group should develop forms, procedures, techniques and advise on type of program necessary for maintaining job information current. It may be possible to secure the advice and services of the United States Employment Service, which has had extensive experience in job analyses and has made analyses for the Army. Or it may be advisable to obtain the advice of the Navy since many of the jobs are of a similar nature and the procedures developed by the Navy would closely fit the requirements of the Coast Guard. Secondly, the services of a number of civilian job analysis technicians would be required to maintain a continuing program of analysis. Thirdly, a number of officers and enlisted personnel who have the necessary qualifications should be trained in job analysis methods. As a minimum qualification, military personnel should be required to pass the battery of tests for job analysts designed by the United States Employment Service. Arrangements can probably be made with the Navy for training job analysts at the Personnel Men's School, U.S. Naval Training Station, San Diego, California.

The particular office that should be responsible for job analysis must be chosen on the basis of the primary purpose for which the analysis is undertaken. There are two offices where a job analysis section may be placed. One is





in the Planning and Control Staff, the other is the Office of Personnel. The placing of the job analysis section depends on the type of program undertaken. Two types are possible: (1) An organizational analysis, that is, a critical determination of what and how jobs are being performed, what the workload is, and what jobs can be eliminated for most effective utilization of personnel. Such analysis would require the full time services of many officers for a long period of time. Moreover, while such a program may be effective, it is drastic and disruptive to the present organization. The full cooperation of units being studied will not be obtained if personnel know that their work is being evaluated and may be changed immediately if not presented in as favorable a light as possible. (2) The second method is based on an assumption that "what is, is correct". This involves the study of jobs as they actually exist. The analysts' are merely collectors of information. Only in cases where glaring discrepancies are revealed should immediate action be taken. After study of all information is made, changes can gradually be introduced without drastic disruption of the existing organization. This method requires a longer time for results to become apparent than may be attained by organizational analysis. It is believed that the best interests of the Coast Guard will be served by assuming that "what is, is correct" until job analysis reveals





the contrary. Consequently, the job analysis section should be part of the Office of Personnel.

The number of personnel required for a job analysis program in the Coast Guard can only be estimated from the experiences of other organizations. However, the actual number required is dependent on the extensiveness of the program that it is desired to maintain. In order to get the job done in a reasonable time, it is believed that once a plan is clearly formulated and established, twenty job analysts will be required for about one year, after that this number can be reduced to about ten analysts to keep the job information current. This number of analysts is exclusive of the clerical assistance that would be required.

#### Establishing Procedures and Techniques

The consulting agency or the job analysis staff must establish the procedures and the techniques for carrying out the job analysis. The procedures for obtaining job information, in the order of their effectiveness for the service, are: (1) job analysts observe the job incumbent and interview the job incumbent and supervisors, (2) job incumbent fills out a questionnaire and is interviewed by an analyst, (3) job incumbent completes a questionnaire, (4) the job supervisor completes the questionnaire. The first method is the most satisfactory method of obtaining accurate factual information; however, this is the most expensive and time





consuming procedure. The technique adopted must be a compromise between an ideal and a practical program that will furnish the best information possible under the particular conditions. The second method of obtaining information is one that has been used successfully in the Navy and, it is believed that, it will give sufficiently accurate results in the Coast Guard. The practice of obtaining job information solely by questionnaire must also be considered. This may be the only feasible method if the staff is small, but the information that will be furnished by many individuals will be useless or of very doubtful value. If the questionnaires are carefully designed, the information furnished by personnel in administrative and clerical positions would probably be highly reliable. Industry and the Public Service have found that the higher the position the more reliable the information furnished by the job incumbent. It is believed that satisfactory information could be obtained by use of the questionnaire followed by interview by the job analyst, and if doubt still exists regarding the job, to follow this with actual observation of the job. In studying jobs in location where it may not be economically feasible to send analysts, reliance must be placed on obtaining information by questionnaire either from the job incumbent or the supervisor.

Regardless of the method employed in obtaining information, whether through analysts or by questionnaire, the job





analysis should be checked on location by two supervisors in the chain of command to ensure accuracy.

After the original information is obtained about the jobs at one unit, similar studies should be carried out at the other comparable units. The jobs can then be compared and composite descriptions written for the individual jobs. However, care should be exercised in assuming that because two jobs have the same designation that they are similar. The duties, responsibilities, or physical requirement of the same job may not be comparable in two different locations. Distinctions between jobs must be clearly resolved, and if necessary, explanations should be included to indicate any unusual conditions that affect a particular job, or a separate job description should be prepared.

The forms to be used in securing and recording the data must be carefully designed to provide all the information desired. If any data is omitted during the original survey of a unit, resurveys of the same unit may be required at a later date. Of the many forms examined, the forms used by the United States Employment Service and by the Navy appear to be designed so as to give the greatest amount of information required by the Coast Guard; of these two, the Navy forms would probably more closely fit the specific needs of the Coast Guard.

The analysis staff must set up a schedule to be followed in collecting the job information. This schedule should





designate the units for study and the time necessary for completion. In this respect, the most satisfactory procedure is to thoroughly study one type of unit, clearly defining and describing all the jobs in that type before undertaking the study of additional units.

Before undertaking a job analysis of all the jobs in the service it is advisable to make a pilot study of a small number of jobs, to test the completeness of forms and adequacy of the procedures and techniques, and to permit elimination of mistakes.

Since the Coast Guard operates as part of the Navy in time of War, and many of the jobs are of a similar nature, there is good reason for adopting the Navy system as is, and fitting the Coast Guard program to that of the Navy. The program being conducted by the Navy is more extensive than that of any other branch of the Armed Services, and is more complete than that of most industries. Moreover, it is already tested and has been found satisfactory in an organization whose nature is very similar to that of the Coast Guard. Many of the jobs are already defined and described by the Navy. By adopting the Navy program it would only be necessary to validate Navy job descriptions to Coast Guard jobs, and extend the study to such jobs that are peculiar to the Coast Guard and have no counterpart in the Navy.



Summary

In summarizing it may be stated that a program of job analysis is necessary in the United States Coast Guard:

- (1) To provide an accurate description of jobs as they actually are performed.
- (2) To provide information for purposes of recruitment, placement, and training of personnel.
- (3) To determine the varying personnel requirements for comparable administrative units.
- (4) To determine the changing aspects of jobs due to technological advances, and reallocation of functions and duties.
- (5) To establish a sound basis for personnel budget requirements.
- (6) To furnish data required for organizational planning.
- (7) To provide information for civil readjustment of personnel being separated from the service.

In view of the uses that can be made of occupational information obtained by a systematic program of job analysis, and the apparent benefits that would accrue to the Coast Guard, it is recommended:

1. That a job analysis program be adopted.
2. That the occupational information now available in the service and in the Navy be examined to determine





whether it is representative of jobs as they actually exist.

3. That all billets in the service be studied, including all officer and enlisted billets and civilian positions, so that their relationship to each other and the organization as a whole will be clearly defined.
4. That in analyzing jobs the assumption be made that "what is, is correct" until proven to be otherwise.
5. That the services of a consulting staff be obtained to advise on the type of program required.
6. That the job analysis staff be organized as a section in the Office of Personnel.
7. That a number of civilian job analysis technicians be hired.
8. That a number of officers and men be trained in job analysis methods and techniques.
9. That the primary procedure of obtaining job information be by questionnaire completed by the job incumbent followed by interview by a job analyst.
10. That the job analysis forms used by the Navy be utilized without change, or with minor adaptation if pilot study indicates that any change is desirable.
11. That the Navy job analysis program be tried, and if found to be suitable for use in the Coast Guard it be adopted. If such program does not fully meet





service requirements, then the program that is adopted should be coordinated as closely as possible with the Navy program.

Although no specific data could be obtained regarding the exact savings in personnel or in dollars effected by the adoption of a job analysis program by any industrial organization, public service agency, or any branch of the Armed Services, the fact that such programs are maintained and continued is proof of their value. It is the considered opinion of the writer that adoption of the recommendations enumerated above would result in positive and concrete benefits to the Coast Guard in the form of more effective utilization of manpower and more efficient performance for the same cost of operation.



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